TROPICAL DISEASES BUREAU.

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KALA AZAR.

YOUNG (T. M'Combie). **Some Facts in regard to the Progress of Kala Azar Work in the Province in General and in Sibsagar in Particular.** —*Proc. Assam Branch. Brit. Med. Assoc. Ann. Meeting. Haflong.* 1923. Jan. 7. pp. 10–19.

This paper gives an inspiring account of the efforts which are being made to remedy the kala azar situation in Assam. From reports of the touring staff during 1919-1920 it was evident that the disease was recrudescing, and had the weapons of defence been those of 20 years ago the result would have been exceedingly grave. The introduction of tartar emetic treatment altered the case entirely, and not only made it possible to cure about 95 per cent. of treated cases, but afforded a means of checking the spread of the disease by eliminating the reservoirs of infection. Kala azar hospitals have multiplied throughout the province, out-door dispensaries have been established, systems of inspection and registration of the population have been undertaken, and early notification of the appearance of kala azar in any family is being enforced. Though at times there has been inevitable difficulty in the enforcement of the rules, the popularity of the treatment is an undoubted fact as evidenced by the increasing number of cases which come forward. In 1921, 1,600 cases were treated, while during eleven months of 1922 the number reached 16,778. For 1923 the figure is even higher, and will probably reach nearly 20,000.

The method of dealing with infected localities is illustrated by two examples described in detail. As a result of the experience gained, it appears that if early notification and treatment of the first case during its first year in any village is carried out, there seems to be a reasonable chance that no further cases will occur, but when the number of cases discovered in one year is large, others will crop up owing to the disease having obtained a firm footing. When any outbreak is restrained by early treatment no explosive infections occur. Early compulsory treatment efficiently applied has a distinct preventive action, and renders removal to fresh sites and segregation of the infected community unnecessary, but if the infection has been firmly rooted by delay in its recognition there is reason to suppose that removal of the population and treatment of the cases will extinguish the outbreak.

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The most careful vigilance has to be maintained, for, owing to our ignorance of the method of infection, it is impossible to predict an outbreak. The regulations which have been issued as the result of long experience are given in the report, and the author is able to state that in Sibsagar, which was threatened with a decimation such as Nowgong underwent in 1891-1901, the disease is now under control.

C. M. Wenyon.

Mackie (F. P.) with Das Gupta (B. M.) & Swaminath (C. S.). **Progress Report on Kala-Azar. (Work carried out in Shillong between June and November, 1921.)**—*Indian Jl. Med. Res.* 1923. Oct. Vol. 11. No. 2. pp. 591–599. With 1 plate. [1 ref.]

The experiments recorded in this paper afford a further demonstration of the difficulty of infecting animals with leishmania. One monkey, two rabbits and two guineapigs were inoculated intraperitoneally with emulsion of spleen juice from a fatal case of kala azar. The monkey and both guineapigs developed a transient infection, while one rabbit was found to have a slight infection when it died six weeks after inoculation. Two rabbits were inoculated intra-ocularly, the one with cultural forms of leishmania, the other with spleen juice from a human case of kala azar. The former was entirely negative, while the latter yielded a culture from the eye on the nineteenth day of the experiment.

It was shown that the leishmania ingested by bed-bugs are in a condition infective to white mice for at least 17 days.

An attempt to infect a monkey with the Crithidia of *Conorhinus rubrofasciatus* gave a negative result. The examination of 39 itch mites from a case of kala azar did not reveal any ingested blood nor leishmania.

A crithidial infection of the sandfly (*P. minutus*) is described. It is evident these flies are liable to infection with both a crithidia and a leptomonas. An examination of geckos (*Hemidactylus*) revealed a trypanosome infection on direct blood examination and a leptomonas infection in 3 out of 28 by culture of the heart blood. The flagellates are named *Trypanosoma hemidactyli* and *Herpetomonas hemidactyli* respectively.

C. M. W.

Indian Medical Record. 1923. August & September. Vol. 43. Nos. 8 & 9. **Kala-Azar Numbers i & ii.**

It has recently become evident that kala azar is wide-spread throughout Bengal, and, with malaria, is exercising a deleterious influence on the economic life of the country. The importance of this disease is recognized by the fact that a conference of the medical profession of Bengal was held under the auspices of the Central Co-operative Anti-Malaria Society, Ltd., in Calcutta, when a series of addresses were delivered dealing with the new situation which has arisen since the prevalence of kala azar in Bengal has been established.

These addresses are published in two special kala azar numbers. The various speakers urge the necessity of immediate action and base their recommendations on the methods which experience has shown to be increasingly efficacious in dealing with the kala azar situation in Assam. It appears that in Bengal the disease occurs sporadically

throughout the country, and that intense village infections such as occur in Assam are not a feature of its distribution. The speakers deal with different aspects of the question—incidence and distribution of the disease, methods of diagnosis and treatment, control of the population with a view to early diagnosis, regulations and procedure to be adopted with a view to its eradication. Apart from the main fact of the prevalence of kala azar throughout Bengal the papers do not contribute any new information, though details of the incidence in certain selected areas are given. They nevertheless serve to call attention to the urgency of the matter, and will undoubtedly act as a stimulus to those who have the power of taking action. They will arouse the interest and enthusiasm of the local practitioners, who have it in their power to bring the antimony treatment within the reach of thousands of sufferers. It was felt that the Anti-Malaria Society, with its established organization, would be the most suitable authoritative body to control the campaign against both malaria and kala azar. There is an opportunity for great philanthropic work on the part of everyone who has an interest in the welfare and development of this fever-stricken country.

C. M. W.

CHATTERJEE (G. C.). **Kala-Azar in Bengal.** [Correspondence.]—*Indian Med. Gaz.* 1923. Nov. Vol. 58. No. 11. pp. 553–554.

At the Conference of the Medical Profession of Bengal which was held under the auspices of the Central Co-operative Anti-Malarial Society, Ltd., a series of resolutions relative to the wide-spread nature of kala azar in Bengal were adopted. It was decided, amongst other things, that the above-mentioned Society was in the best position to deal with the disease, which was so intimately intermixed with malaria, and that in order to facilitate the carrying out of preventive measures it was desirable that the sanitary sub-committees of District Boards be composed mainly of medical men who should be given the right of distributing the sanitary grant of the District Board in consultation with the Society.

C. M. W.

YOUNG (Charles W.). **Kala-Azar in China.**—*China Med. Jl.* 1923. Oct. Vol. 37. No. 10. pp. 797–822. With 7 maps, 1 fig. & 1 chart. [42 refs.]

This is a most interesting article which summarizes our knowledge of kala azar in N. China. The first case was that of a German soldier who contracted the disease during the relief of the Pekin legation in 1900. He died later in Germany, and the peculiar intracellular bodies which occurred in preparations of the spleen, liver and bone marrow were demonstrated at the Leipzig Medical Society in February 1903. No one was able to give a satisfactory explanation of their nature, and it was only after LEISHMAN'S announcement made later in the same year that the similar bodies found by him in a case of Indian kala azar were actually parasites that MARCHAND and LEDINGHAM in 1904 realized what the bodies were which they had seen in Germany.

From that date till 1911 seven other cases were reported from N. China. COCHRAN (this *Bulletin*, Vol. 3, p. 130, map) then gave the first

thorough account of the disease as it exists in China and Korea. The observations recorded in this paper, which is illustrated by a series of maps and charts, shows that it is more wide-spread than was hitherto supposed. COCHRAN reported twelve centres which have now to be extended to twenty-five, while in the centres previously noted the infection is much more intense than the reported cases led one to suspect. A careful examination was made of the village of Sha Liu Ts'un in the southern part of Tinghsien, from which nine cases of

MAP OF DISTRIBUTION OF KALA AZAR IN NORTH CHINA.

Besides the endemic areas (shaded black) shown on map there are areas in Hupeh and lower Kiangsu of which the limits have not been determined. [After Dr. Charles W. YOUNG's map in the *China Medical Journal*.]

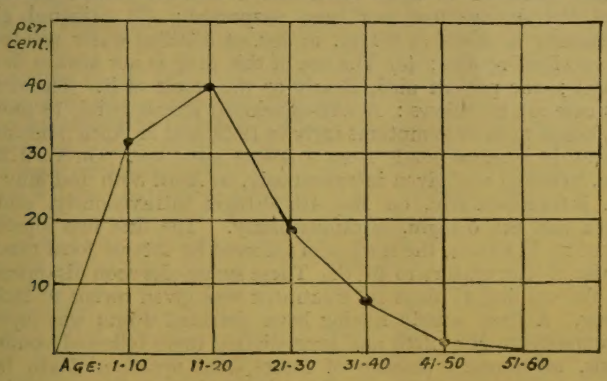
kala azar had been seen at the Taylor Memorial and Hodge Memorial Hospitals in Paotingfu. In all, 97 persons, belonging to 40 families, were examined, and it was found that one family in every twelve had had a case in the last four years. This means that about $1\frac{2}{3}$ per cent. of the population had had kala azar in that time. In travelling to the above-mentioned village a less careful examination was made in eight other villages, and in five of these definite evidence of the

existence of kala azar was obtained. In these examinations reliance was placed on the clinical picture, especially marked enlargement of the spleen, and a positive globulin test. The village which received particular attention lies on a sandy plain. Its inhabitants are prosperous farmers, and many of the houses are built of brick. With the absence of poverty there was little infestation with lice. The infected houses were fairly evenly distributed in the village, and the 20 cases found there belonged to 20 different families. Though the meaning of a positive globulin test in animals is not yet understood, a number of animals were tested by this means. Three hens and a cow gave a positive result, but 3 dogs and 2 cats were negative.

As regards kala azar in other areas WYLIE of Paotingfu (this *Bulletin*, Vol. 17, p. 356) has seen 84 cases between 1918 and 1922. The area from which they came lies to the south of the hospital centre. A spot map of the Pekin Union Medical College Hospital shows that in the Chihli Province 100 cases were seen between 1916 and 1922, and that these came from areas in railway communication with the centre. Their distribution along these routes is no indication of the actual intensity in the Province. In a clinic at Pien T'ang, 100 li east of Hsüchowfu, MACFADYEAN saw 25 cases which he diagnosed as kala azar among 125 patients. At Ting Chwang, 18 li south of Hsüchowfu, it is reported by the inhabitants that every second child in the village has the disease; while at another village, Hwang Mo Kang, 3 li south of Hsüchowfu, where there are about 100 families, there are 20 cases.

From the data available it is safe to say that kala azar is endemic over most of Chihli, Shantung, north-western Kiangsu, northern Anhui and northern Honan. Furthermore, there are areas not indicated on the map, in Hupeh and lower Kiangsu, but the limits of these have not been determined.

Other matters relating to the disease as it occurs in China receive attention. A table and chart illustrating the age incidence of 762 cases



Age incidence of kala azar in China.

[Reproduced from the *China Medical Journal*.]

shows that, as is commonly the case, kala azar attacks chiefly children and young adults. The value of the globulin test is discussed and the remark is made that while there are no grounds beyond experience on which to base the statement that the test is specific for kala azar,

such has been the estimate of most who have used it. In a foot-note it is pointed out that Dr. MELENEY of the Pekin Union Medical College has shown that it is constant in well developed cases of schistosomiasis and that it tends to disappear under antimony treatment. The formol-gel test was also found to be positive. As regards kala azar, the globulin test when positive is only considered as yielding presumptive evidence of the disease, which must be finally diagnosed by the discovery of leishmania. By adopting the technique devised by the author and VAN SANT (this *Bulletin*, Vol. 19, p. 548) the parasites can be recovered from the peripheral blood of a large percentage of cases. A table shows that in 27 slides made from the centrifuged deposit of nine specimens of blood of untreated cases all the specimens showed parasites in one or more slides. The films are made from the lowest layer of the leucocyte deposits as described in the method for blood culture.

Clinically there is nothing peculiar in the cases. It is noted that in the kala azar areas there occur many cases of splenomegaly which are not due to this disease and cannot be attributed to malaria, which is not endemic there. The nature of this condition is not known.

C. M. W.

ARCHIVOS DEL INSTITUTO NACIONAL DE HIGIENE DE ALFONSO XIII. 1923. Aug. Vol. 2. No. 2. pp. 67–84. With 9 text figs. [3 refs.].
Nuevos Casos de kala-azar infantil en el centro de España (Cáceres, Madrid, Toledo). Un caso de muerte por el Stibenyl.

The paper gives a further record of kala azar in Spain. Thirteen cases are recorded in the body of this paper and five more in an additional note. There are three main points of interest: (1) All the cases occurred in Spain itself and in districts where the existence of the disease had not been suspected; (2) Stibenyl given intravenously in doses of 0·1gm. in 2cc. of distilled water yielded as a rule excellent results; (3) The use of this drug is not always devoid of danger; one patient died, clearly as the result of it. The details of this case are as follows: A well-developed female child, 19 months of age, began to show symptoms early in 1923, and in April leishmania were seen in a smear made from a spleen puncture. On April 28th, 0·05gm. Stibenyl was given intravenously, on April 30th and May 2nd 0·1gm. intramuscularly, on May 4th 0·15gm intravenously, and on May 6th and 8th 0·15gm. intramuscularly. The first five injections produced no ill effects, the sixth was followed by intense local reaction and a rise of temperature to 40° C. These symptoms soon disappeared.

For the ensuing 17 days no treatment was given owing to lack of the drug. A fresh supply having been obtained 0·1gm was injected intravenously on May 27th and immediately there followed vomiting, cyanosis, involuntary passage of faeces, and syncope, death being almost instantaneous. The cause assigned is anaphylaxis, and the author records that in a former patient where an interval of 10 days had been allowed to elapse between injections 0·1gm. intravenously produced intense vomiting and a papulo-erythematous eruption which lasted for several hours. Experiments carried out on a dog, however, with an interval of 12 days between injections, caused no anaphylactic symptoms.

H. Harold Scott.

BASSETT-SMITH (Percy). **Naval Medical History of the War. Section of Tropical and Sub-Tropical Medicine. Part II.—(ii) Kala Azar.**—*Jl. Roy. Nav. Med. Serv.* 1923. *July.* Vol. 9. No. 3. pp. 201–203.

A short account of kala azar based on two cases which occurred in the navy. The first has been already reported by the author (this *Bulletin*, Vol. 5, p. 266). In the present paper it is stated that the treatment with atoxyl and autogenous vaccines of killed cultures of leishmania had brought about a complete cure, for the patient was at work in 1921, seven years after his course of treatment was completed. The second case, also from Malta, was treated successfully at Greenwich with injections of tartar emetic. He remained well for a year but was then lost sight of.

C. M. W.

FONZO (Ferdinando). **Kala-azar e malaria in raporto alla stagione e al clima.** [Kala Azar and Malaria in regard to Season and Climate].—*Pediatria.* 1923. Dec. 1. Vol. 31. No. 23. pp. 1262–1269. With 3 charts. [29 refs.]

This paper is mainly a study of kala azar from an epidemiological aspect. This disease and malaria occur in the same district, but the author does not agree that they are antagonistic, as some have thought, though he has not met with a case in which the two were co-existent. The period of prevalence of malaria is the summer, of kala azar the winter and spring. Further, he does not support the theory that the transmitter of kala azar is the *Pulex serraticeps* [*Ctenocephalus canis*] because, it is stated, this flea does not bite in the winter months.

H. Harold Scott.

YOUNG (Charles W.) & VAN SANT (Helen M.). *Leishmania donovani* **in the Peripheral Blood.**—*Jl. Experimental Med.*, 1923. Sept. 1. Vol. 38. No. 3. pp. 233–256. [21 refs.]

This paper is a further elaboration of one previously noticed in this *Bulletin* (Vol. 19, p. 548), and describes the method employed by the authors for obtaining cultures of leishmania from the peripheral blood. As described before, 10 cc. of blood are taken from a vein and ejected into a flask containing 50-70 cc. of citrated Locke's solution (sodium chloride 9·2 gm., potassium chloride 0·5 gm., calcium chloride 0·1 gm., sodium citrate 10·0 gm., distilled water 1,000 cc.). The mixture when taken to the laboratory is divided in two 50 cc. centrifuge tubes, which are centrifuged at low speed (five minutes at 750 revolutions per minute with a radius of 20 cm.). The red cells with some leucocytes are then found lightly packed at the bottom while the fluid is cloudy. The fluid, after transfer to another sterile tube, is centrifuged for a similar period at high speed (1,375 revolutions). The sediment which then forms consists almost entirely of platelets and a few red cells and polynuclear leucocytes. On careful search extracellular leishmania have occasionally been found in films of the platelet deposit. The cultures are made by inoculating tubes of N.N.N. medium from the platelet deposit. It was previously stated that the range in pH which permitted growth was limited. Subsequent experience has shown that the limits are much wider and that growth will take place between pH 5·0 and 9·8.

It was found that leishmania were most readily discovered by microscopic examination in films made from the bottom of the centrifuge tube after the first centrifuging. They were less readily detected in the uppermost leucocytic layer. Apparently the infected white cells go to the bottom more easily than those uninfected.

Employing this culture technique, 147 cultures were made from 34 specimens of blood. A culture was obtained in 91·2 per cent. of these. When compared with a series of cultures made from spleen juice it was found that the blood cultures gave a slightly better result.

The effects of treatment with tartar emetic on the possibility of obtaining cultures was also considered. In the series tested it was found that cultures were not obtained after patients had received 12 mgm. of antimony per kilogram of weight. It is not maintained, however, that such a dose is curative.

In the Peking Medical College Hospital the following procedure is now adopted. A 10 cc. sample of blood is taken and after dilution is distributed in the two centrifuge tubes. From one tube a series of cultures is made from the platelet layer after the second centrifuging, while smears are made from the lowest part of the deposit after the first centrifuging. From the second tube a series of cultures is made by inoculating with both the lowest part of the deposit after the first centrifuging and with the platelet deposit after the second. In this way one 10 cc. sample of blood gives one series of blood smears and two series of cultures. The combined results offer the maximum of information. In addition a globulin test may be made from the citrated blood remaining in the syringe after expulsion into the Locke's solution.

C. M. W.

SHORTT (H. E.), SWAMINATH (C. S.) & SEN (Ram Taran). **A Second Report on the Recovery of *Herpetomonas donovani* from the Urine of Kala-Azar Cases.**—*Indian Jl. Med. Res.* 1923. Oct. Vol. 11. No. 2. pp. 667–668. [1 ref.]

In a previous communication (this *Bulletin*, Vol. 20, p. 868) the senior author reported the successful culture of leishmania from the centrifuged deposit of the urine of a case of kala azar. Including the original case, nine in all have been examined from this point of view, with the result that cultures were obtained in three. It is evident, therefore, that a certain percentage of kala azar cases of ordinary type excrete *L. donovani* in the urine.

C. M. W.

NAPIER (L. Everard) & DAS GUPTA (B. M.). **Cultural Examination of the Urine in Kala-Azar.**—*Indian Med. Gaz.* 1923. Nov. Vol. 58. No. 11. pp. 530–531. [2 refs.]

Encouraged by SHORTT's success the authors attempted to demonstrate leishmania by the culture method in the deposit of urine of kala azar cases. Sixteen cases yielded negative results, but it is admitted that SHORTT obtained his deposit by centrifuging, while in the investigation described it was the result of standing the urine for two hours.

C. M. W.

De (Monindra Nath). **An Unusual Complication in an Acute Case of Kala-Azar.**—*Indian Med. Gaz.* 1923. Oct. Vol. 58. No. 10. pp. 484–485. With 1 fig.

The paper describes the case of a Hindu woman aged 35 who was admitted to hospital for extreme anaemia and emaciation. The condition was an afebrile one. The discovery of a fixed fungating mass in the position of the cervix uteri led to a diagnosis of inoperable carcinoma. After death it was discovered that the disease was kala azar and that the condition of the cervix was one of noma. There was no enlargement of the liver or spleen though a heavy leishmania infection occurred.

C. M. W.

d'Astros, Giraud (P.) & Raybaud (J.). **Quatre cas autochtones de kala-azar infantile observés à Marseille.**—*Bull. Acad. Méd.* 1923. July 31. Year 87. Vol. 90. 3rd Ser. No. 31. pp. 114–118.

Cases of kala-azar arising in France have already been recorded (this *Bulletin*, Vol. 20, p. 569). The authors of the paper under review describe four other cases which came under their notice in Marseilles. There was nothing peculiar about these cases, which were all in children between three and four years of age. The clinical picture was "absolutely classic."

C. M. W.

Mallardi (Mario). **I primi due casi di leishmaniosi curati a Bari.**—*Pediatria.* 1924. Jan. 1. Vol. 32. No. 1. pp. 47–49.

A record of two cases of infantile kala azar which were cured at Bari by intravenous injections of tartar emetic. The one case received 15 injections of 3 cc. of a 1 per cent. solution and the other 0·34 gram of the drug between July 13 and August 22.

C. M. W.

Brahmachari (U. N.). **Chemotherapy of Antimonial Compounds in Kala-azar Infection. Part IV. Further Observations on the Therapeutic Values of Urea Stibamine. Part V. Amino-Antimonyl Tartrates. Part VI. Cumulative and Tolerance Experiments with Tartar Emetic.**—*Indian Jl. Med. Res.* 1923. Oct. Vol. 11. No. 2. pp. 393–404; 405–410; 411–415.

——, Das (Judhistir) & Sen (Parimal Bikash). **Part VII. The Estimation of Small Quantities of Antimony in Presence of Organic Matter.**—*Ibid.* pp. 417–419.

Part IV.—Nine cases of kala azar which were treated with intravenous injections of urea stibamine are described. In all of them apparent recovery had taken place. Further notes on four cases previously reported as having been cured by this drug (*Indian Jl. Med. Res.* 1922. Vol. 10, p. 492) are appended. The patients are all in perfect health and no relapse has occurred. A note by Shortt describes the use of the drug in five other cases. In some of these a striking result was obtained. He points out that the advantages of urea stibamine over other antimony preparations are these:—

1. The short course, occupying only two or three weeks, necessary to a complete cure.
2. The rapidity with which the symptoms of the disease disappear.
3. The fact that no symptoms of intolerance were met with in any of the cases.

He adds that the results are actually better than those claimed by Dr. Brahmachari himself.

Part V.—This section is largely chemical and deals with the preparation of amino-antimonyl tartrates. Their leishmanicidal properties have not yet been tested.

Part VI.—The minimal lethal dose for a guineapig of tartar emetic is ·055 gm. per kilo of body weight. The repeated injections of smaller doses into these animals did not give rise to any tolerance towards the drug except rarely. There was generally an indication of a cumulative action which rendered the animals susceptible to the next higher dose.

Part VII.—A method for the estimation of minute quantities of antimony in the presence of organic matter is described.

C. M. W.

SHORTT (H. E.) & SEN (Ram Taran). **Urea Stibamine in the Treatment of Kala-Azar.**—*Indian Jl. Med. Res.* 1923. Oct. Vol. 11. No. 2. pp. 653–659. [1 ref.]

The authors report the treatment of a further 16 cases of kala azar by urea stibamine (see note to paper by BRAHMACHARI). The results have been most satisfactory and the statement is made that the drug is superior to any of the other antimony preparations in general use. In uncomplicated cases of average severity 2 gm. were usually sufficient to bring about a cure. The doses are given on alternate days over a period of 20 days. In long standing cases and some acute infections of a fulminating type larger total quantities given over a longer period were required. Several of the cases had proved resistant to sodium or potassium antimony tartrate. The initial dose was 0·1 gm. and this was increased by 0·05 gm. up to a maximum of 0·25 gm. The drug if it escapes accidentally into subcutaneous tissues gives rise to no irritation, a very important point, especially in the treatment of young children. Its action is rapid, and it is most beneficial in restoring the leucocyte count. The series of cases treated is set out in tabular form. The average amount of drug given to each case is 2·6 gm., while the average number of injections and period of treatment are 12 and 32 days respectively. As the authors remark, when this is compared with the 30 injections and 90 days required for a minimum course of sodium antimony tartrate the advantages of urea stibamine are obvious.

C. M. W.

BRAHMACHARI (U. N.). **Recent Advances in the Antimonial Treatment of Kala-Azar by the use of Urea Stibamine.**—*Calcutta Med. Jl.* 1923. Nov. Vol. 18. No. 5. pp. 481–484. (Discussion pp. 484–490.)

In 1922 (*Indian Jl. Med. Res.*, Vol. 10, p. 496) the author gave an account of his method of preparing urea stibamine or urea antimonyl tartrate, and recorded the improvement which had taken place in eight cases of kala azar which had been treated by intravenous injections of the drug. In the lecture of which the paper under review is the report the author gives his further experiences in the use of the drug, especially in what are termed refractory cases which had proved resistant to treatment with antimony tartrate. Three such cases are described,

in all of which more or less prolonged treatment with sodium or potassium antimony tartrate had failed to produce any distinct improvement. Directly urea stibamine was substituted a definite change for the good occurred and there is every reason to suppose that the cases were cured. Major SHORTT's similar experiences with the drug are quoted. It was found that the duration of treatment and the number of injections required for complete cure were less than with any other antimony preparation. It is possible that the drug can be administered intramuscularly, but, though this has been attempted with what appear to be satisfactory results, it is as yet too early to express any definite opinion. The dosage used in the cases treated intravenously was 2 gm. in 9 injections, starting from ·15 gm., and increasing by ·05 gm. twice weekly, 1·6 gm. in 9 injections in doses of ·1 to ·25 gm. during 6 weeks, and 2·85 gm. in 13 injections in doses of ·1 to ·25 gm. during 2 months. The solution of the drug should not be boiled, and at present it is only prepared privately by Dr. Brahmachari himself or his chemical assistants.

In the discussion following the lecture NAPIER stated that a boy aged 12 was treated with 10 injections of urea stibamine, and at the end of four weeks his spleen could no longer be felt. He considered the case as completely cured. An interesting point brought out by NAPIER was that a positive spleen puncture or blood culture after antimony treatment did not necessarily indicate that the disease had escaped control. He knew of two cases which gave positive culture results after a course of sodium antimony tartrate, and were subsequently found to have completely recovered without any further treatment.

C. M. W.

NAPIER (L. E.). **The Treatment of Kala-Azar by Meta-Chlor-Para-Acetyl-Amino-Phenyl Stibiate of Sodium (Von Heyden 471), 11 Cases.**—*Indian Med. Gaz.* 1923. Dec. Vol. 58. No. 12. pp. 578–582. With 1 chart. [8 refs.]

The paper describes the treatment of 11 cases of kala azar with a new drug the name of which appears in the title. It was administered intravenously after solution (1 to 5 per cent.) in distilled water. The largest dose given was 0·5 gm., which was the third dose in this particular case. Nausea and vomiting resulted. The previous dose of 0·4 gm. gave rise to no symptoms. The smallest dose which caused any symptoms was 0·2 gm. In no case were less than 10 injections given. By giving a first dose of 0·2 gm. and subsequent doses of 0·3 gm. on alternate days a course of treatment is completed in 19 days. It is probable that 0·4 gm. must be considered the maximum dose for an adult. In every case treated the improvement was uniformly rapid, and all the cases appear to have been cured in a very short course of treatment

Most of the unpleasant symptoms associated with prolonged treatment with the antimony tartrates are absent. Though it is impossible to dogmatize on such a limited series of cases, the author thinks that undoubtedly this new compound is very much better than antimony tartrate, but whether it is better than "urea stibamine" is as yet impossible to say. One advantage it has—it is a definite compound which will not vary in composition. It is prepared without difficulty and does not deteriorate in the Indian climate.

C. M. W.

NAPIER (L. E.). **The Failure of "Bayer 205" in the Treatment of Kala-Azar.**—*Ind. Med. Gaz.* 1923. Sept. Vol. 58. No. 9. pp. 415–417. [2 refs.]

The author reports his experience in the treatment of six cases of kala azar with "Bayer 205." Owing to serious consequences described by MOLLOW (this *Bulletin*, Vol. 20, p. 102), only small doses were used in the first four cases. The first case, in an adult, received during 22 days 10 intravenous doses varying from 25-500 mgm., with a total of 2·115 gm. The second case, a child 2½ years of age, also had during 24 days 10 doses, the first 4 of which were given intramuscularly, the rest intravenously; they varied from 10 to 150 mgm. with a total of 0·845 gm. The third case was in a boy aged 10, who received intravenously during 26 days 10 doses varying from 25 to 250 mgm., the total amount being 1·595 gm. The fourth case, also a boy, aged 12, was given on alternate days 5 intravenous doses ranging from 100 to 225 mgm., a total of 0·925 gm. In none of these cases was any improvement noted and spleen puncture after treatment revealed parasites still present. It is reported that three of these cases were afterwards successfully treated with sodium antimony tartrate.

YORKE (this *Bulletin*, Vol 20, p. 572) having reported the probable recovery of a case of kala azar after the use of larger doses of 205, the author treated two other cases. An adult received on alternate days six doses ranging from 0·25 to 1·0 gm. with a total of 4·75 gm., while another received seven similar doses with a total of 5·75 gm. In neither did any improvement follow. They were both cured with sodium antimony tartrate.

The author concludes that the complete failure of the preparation in six consecutive cases can only mean that "Bayer 205" is valueless in the treatment of kala azar. It is interesting to note that none of the six cases exhibited the violent reaction reported by MOLLOW.

C. M. W.

BUXTON (P. A.). **Canine Leishmaniasis not found in Jerusalem.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1923. June 21. Vol. 17. No. 3. p. 212.

The destruction of stray dogs in Jerusalem gave the author an opportunity of examining these animals for evidence of leishmania infection. Of about 1,000 dogs destroyed, 156 on account of their emaciated condition appeared to offer the best chance of discovering such an infection. From the blood, liver, spleen and bone marrow two films were made, but in none of these were any leishmania found; 16 cultures of the marrow were made, and these were likewise negative. Several cases of canine piroplasmosis were met with.

C. M. W.

CASTORINA (Giuseppe). **La reazione di Brahmachari nella Leishmaniosi infantile.**—*Pediatria.* 1923. Nov. 1. Vol. 31. No. 21. pp. 1172–1179. [4 refs.]

The author describes his experiences with the globulin test in kala azar which was described by BRAHMACHARI (this *Bulletin*, Vol. 11, p, 152; Vol. 19, p. 4). It consists in the addition of serum to two parts of distilled water. When positive the mixture becomes turbid

and on standing a precipitate forms. In 23 cases of infantile kala azar in Italy the reaction was strongly positive (+++) in 19, positive (++) in two, doubtful (±) in one, and negative in one. In 45 cases of other diseases it was positive in 4, doubtful or slightly positive in 4, and negative in the others. The author's conclusion, which appears to be justified by the protocols, is that the reaction is far more likely to be positive in kala azar than in any other disease, and he disagrees with Nasso (this *Bulletin*, Vol. 20, p. 570), who found it of no value. [It may be noted that in the paper by Young, reviewed in this number, it is pointed out that the reaction is positive in kala azar and also in schistosomiasis].

C. M. W.

Castorina (Giuseppe). **Lo schema di Arneth nella leishmaniosi infantile prima e durante la terapia antimoniale.**—*Pediatria.* 1923. Dec. 1. Vol. 31. No. 23. pp. 1270–1277. [4 refs.]

As a result of the examination of the blood of 12 cases of infantile kala azar it was noted that the Arneth formula showed a marked deflection towards the right. As improvement took place during treatment there was a gradual return to the normal or even in some cases to the left of the normal.

C. M. W.

Leão (Antonio Eugenio de Arêa). [In Portuguese and English.] **A Reacção de Wassermann na Leishmaniose. The Wassermann Test in Leishmaniosis.**—*Mem. Inst. Oswaldo Cruz.* 1922. Vol. 15. No. 1. pp. 209–219 [Portuguese]; 116–124 [English].

From observations on 60 cases of cutaneous leishmaniasis in Rio de Janeiro it is concluded that this disease *per se* does not give rise to a positive Wassermann reaction. When such a reaction is obtained there is always evidence of associated syphilis.

C. M. W.

Cornwall (J. W.). **Note on the "Resistant" Forms of *Leishmania donovani* found in NNN Cultures.**—*Indian Jl. Med. Res.* 1923. Oct. Vol. 11. No. 2. pp. 587–589.

Row described what he termed resistant forms of leishmania which appeared in old cultures (this *Bulletin*, Vol. 20, p. 103). The author of the present paper points out that there is no evidence that the rounded aflagellate bodies are actually resistant, and that their appearance is probably an indication of exhaustion of the nutrient material in the medium. He concludes with ample justification that they are degenerate phases destined to death unless invigorated by sub-culture in fresh medium.

C. M. W.

i. Tripputi (Vincenzo). **Nota clinica sulla leishmaniosi infantile.**—*Pediatria.* 1923. Nov. 15. Vol. 31. No. 22. pp. 1236–1238.

ii. Castorina (Giuseppe). **Un caso di leishmaniosi infantile a decorso molto protratto.**—*Pediatria.* 1924. Feb. 1. Vol. 32. No. 3. pp. 174–176. With 1 fig.

i. This paper records a fatal case of kala azar in an infant five months and twelve days old. It is remarkable in that death ensued twenty-two days after the first signs of illness.

ii. A record of a very chronic case of kala azar in a child The illness commenced when it was five months old and persisted till the time of its death six and a half years later.

C. M. W.

Bose (Indubhushan). **A Case of Dermal Leishmaniasis.**—*Calcutta Med. Jl.* 1923. July. Vol. 18. No. 1. pp. 308–309. With 1 coloured plate.

The paper records what appears to be a case of oriental sore contracted by direct contact with another case. The patient, a youth of 17, was trying "the strength of his wrist" with another class mate who had a sore on his right hand. Ten days after contact a papule appeared at the base of the little finger and this developed into a typical sore in which leishmania were found. The case is remarkable for the short incubation period, but it must be admitted that the absolute proof, that the sore with which he came into contact was actually one due to leishmania, is wanting. Several other sores due to auto-infection through scratching appeared, but all were cured by intravenous injections of antimony tartrate and local applications of antimony oxide in lanoline.

C. M. W.

Vigne (Paul) & Pringault (E.). **Gomma sous-cutanée à Leishmanias.** —*Bull. Soc. française de Dermat. et Syph.* 1923. Feb. 8. Vol. 30. No. 2. pp. 99–103. With 2 text figs. [1 ref.]

A case of oriental sore had nine lesions in early stages of development on the left forearm. There was one on the left wrist which was healing and an active one on the right elbow. The nine sores on the left forearm were excised. The wounds healed, as also did the other sores. Two months later there appeared near the left elbow a small subcutaneous nodule over which the skin could be pinched up. It felt like a small subcutaneous lymphatic gland. It was excised and sectioned, and was found to have a capsule of fibrous connective tissue within which was a tissue composed of large cells, embryonic cells, connective tissue cells, some blood vessels and rare polynuclear cells. The tissue had evidently degenerated towards the centre to form an amorphous substance. The interesting feature of the lesion is that it was distinctly subcutaneous in position and was structurally like a gumma. The large cells contained *Leishmania tropica.*

C. M. W.

Kligler (I. J.). **Oriental Sore in Palestine, with a Report of a New Endemic Focus.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1923. Nov. 15. Vol. 17. No. 5. pp. 334–336. [1 ref.]

In Palestine there are two endemic foci of oriental sore. One is central at Jericho and extends to the Dead Sea, the other is at Kantara. The disease in the latter focus resembles that of Aleppo and differs in certain respects from the Jericho type.

C. M. W.

Pupo (João de Aguiar). **A leishmaniose tegumentar em São Paulo.**— *Ann. Paulist. Med. e Cirurg.* 1923. July-Aug. Year 11. Vol. 14. Nos. 7–8. pp. 59–66. With 7 text figs & 1 map.

Cutaneous leishmaniasis is endemic over the whole of S. Paulo, and is apparently increasing. In 1914 at the Hospital for Venereal and Skin Diseases 13 per cent. of the in-patients were under treatment

for this disease, in 1916 there were 26 per cent., and in 1919, 48 per cent. It is sufficiently prevalent to affect seriously the labour conditions, not merely because of the time lost in treatment, but also on account of complications such as tetanus, erysipelas, myiasis and phagedaena which attack many who neglect the local sore. In one district—Albuquerque Lins—as many as 68 per thousand of the population are affected. Until the vector is known and the parasites can be attacked in the transmission stage, the writer recommends that a hospital should be erected in a central town for the adequate treatment of patients by tartar emetic. Baurú is suggested as being readily accessible from the various districts in which the disease prevails at present, and also from Aguapehy, in which direction the country is now developing.

H. Harold Scott.

MONTENEGRO (João). **Leishmaniose em Caës.**— *Ann. Paulist. Med. e Cirurg.* 1923. Nov. Year 11. Vol. 14. No. 11. pp. 156–157.

PEDROSO has shown that in S. America dogs suffer from a natural cutaneous leishmaniasis, and that it is possible to infect dogs by inoculating them intradermally with virus from human cases or with cultures of leishmania. In conjunction with BRUMPT an account of four dogs which were thus infected was published. Three of these succumbed to the disease. The author of the paper under review finds that in his experience dogs which have been infected recover in a year or more and that the mortality reported by the earlier observers was due to other causes, such as ill-treatment of the animals. As regards the spread of infection in human cases from the skin to the buccal and nasal mucosa, it appears, as PEDROSO maintained, that this is due to autoinoculation. The view that the parasites are spread by means of the blood stream is not supported by experiments conducted by the author, who failed to obtain any infection after inoculating dogs intravenously.

C. M. W.

i. SERGENT (Etienne) & TRIOLLET (R.). **Chronique du bouton d'Orient en Algérie. Septième cas constaté hors des régions sahariennes.**— *Arch. Inst. Pasteur d'Algérie.* 1923. Dec. Vol. 1 No. 4. p. 612.

ii. OECONOMOU & PETZETAKIS. **Leishmaniose autochtone étendue du pavillon de l'oreille, simulant un lupus vulgaire, guérie par les injections locales d'émétine. (Premier cas signalé à Alexandrie.)**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1924. Jan. 3. Year 39. Vol. 47. 3rd Ser. No. 39. pp. 1846–1852. With 2 figs.

iii. PANAYOTATOU (Angélique). **"Leishmaniose cutanée" ou "Bouton d'Orient" à Alexandrie d'Egypte. Deux cas de localisation inédite.**— *Ibid.* 1923. Nov. 22. Year 39. Vol. 47. 3rd Ser. No. 33. pp. 1527–1532. [2 refs.]

i. A record of a case of oriental sore in an old woman.

ii. The title of the paper sufficiently describes its contents, which call for no further remarks.

iii. The paper records four cases of oriental sore which were successfully treated with local emetine injections.

C. M. W.

RELAPSING FEVER AND OTHER SPIROCHAETOSES.

BAERMANN (G.). **Klinische und experimentelle Untersuchungen ueber Spirochaetenerkrankungen und Spirochaeten (in Deli, Sumatras Ostküste).** [Clinical and Experimental Investigations into Spirochaetal Diseases and Spirochaetes at Deli.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1923. Vol. 63. No. 6. pp. 885–921. [25 refs.]

During the period 1913-1919 five cases of a disease resembling Weil's disease occurred amongst the European personnel of the estate adjoining the Central hospital of Petoemboekan in Sumatra. Similar cases had been noted previously. Of the five described, four proved fatal. Another case which may be included in the group is the one described by SCHUEFFNER (this *Bulletin*, Vol. 13, p. 300), in which the symptoms were those of blackwater fever. In the blood of the patient there occurred numerous spirochaetes as well as benign tertian malarial parasites. In addition to the severe disease of Europeans there occur other conditions in natives not associated with the serious symptoms of typical Weil's disease. During 1921-1922, six such cases which suffered from jaundice were studied by inoculation of guineapigs. Nothing definite resulted from these experiments. After this a further series of eight similar cases was investigated carefully by inoculation of guineapigs and by culture. In every case leptospira were discovered and the animals contracted severe diseases typical of experimental Weil's disease or infections of a milder type. In some cases the strains were passed to other animals in series. From the animals cultures were obtained, and these proved infective to guineapigs, which responded as they do to strains of Weil's disease virus. In addition to these experiments a series of serological tests were made with sera of known Weil's disease and Japanese seven-day fever. Some of the strains isolated were influenced by these sera, others not. As to the relation of the strains isolated in Sumatra to those of Weil's disease or seven-day fever the author hesitates to give a definite opinion. All that can be asserted is that they belong to the same group of organisms.

In a certain number of unclassified fevers spirochaetes have already been recorded. Thus REIMER (1917) claims to have seen such an organism in Wolhynica fever, and COLES (1919) a spirochaete in the blood of a trench fever case. COUVY and DE LA RIVIERE (1918) also claimed to have discovered a spirochaete in trench fever. SALOMON and NEVEU (1917) recorded the presence of spirochaetes in three cases of trench nephritis. The serum of two of these cases did not protect against *S. icterohaemorrhagiae*. COUVY and BROQUET (1920) discovered spirochaetes in cases of dengue in Beyrout. In all these cases there appears to be some doubt about the observations, and there is no evidence that the organisms actually belonged to the leptospira group. In other cases, however, spirochaetes of this type have been found. MARTIN and PETTIT (1917), and MANINE, CRISTAU and PLAZY (1917) investigated a number of cases of supposed Weil's disease in Lorient and its vicinity. Guineapigs were infected and the organism isolated. In the series of 31 cases, though there was reason

to believe that the disease was actually Weil's disease, jaundice was only present in three, while only four died. PETTIT investigated the organism in a series of cases which showed no jaundice. He noted that the organism was most numerous in the blood and urine and that it had no pathogenicity for guineapigs. The serum of convalescents had no effect on the leptospira of Weil's disease. Similar observations were made by CRISTAU, FIESSINGER and NETTER and SALANIER. The isolation of leptospira from seven-day fever of Japan by IDO, ITO and WANI is well known. Similarly in blackwater fever the presence of spirochaetes has been recorded. ASHBURN, VEDDER and GENTRY (1912) claimed to have seen a spirochaete in the blood in Manila. D'ESQUIER (1918-1920) stated that he had seen a possible leptospira in the liver of a fatal case of this disease. BLANCHARD and LEFROU'S observations on blackwater fever lead them to believe that a spirochaete is the aetiological factor in at least some cases.

These observations tend to show that apart from the well-established diseases, Yellow fever, Weil's disease and seven-day fever of Japan, in which leptospira are recognized as the causative agents, there exist other conditions which are associated with similar infections. The investigations recorded in this paper are a definite contribution to the subject, and demonstrate that in Sumatra, apart from the typical Weil's disease from which leptospira highly pathogenic to guineapigs can be recovered, there occur a whole series of milder diseases, associated or not with jaundice, and from which leptospira may with care be isolated. The leptospira may or may not be pathogenic to guineapigs. The less virulent strains on passage through a series of animals may eventually acquire a virulence similar to the organisms of typical Weil's disease. The experiments are in a preliminary stage, but the facts so far as they go offer a field for further research.

C. M. Wenyon.

SNIJDERS (E. P.). **Spirochaetosis ictero-haemoglobinurica en Spirochaetosis ictero-haemorrhagica.**—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1923. Vol. 63. No. 4. pp. 489–499. With 3 plates. [24 refs.]

After giving in tabular form a comparison between the clinical and epidemiological features of pappataci-fever, dengue fever, nanukayami, Weil's disease and blackwater fever, *i.e.*, all diseases lately ascribed to leptospirae, the author points out the uncertainty of differential diagnosis between these diseases. A comparison is made of the anatomo-pathologic picture of Weil's disease and blackwater fever. There is no reason to believe that SCHÜFFNER'S case of febrile haemoglobinuria in Sumatra [this *Bulletin*, Vol. 20, p. 883], in which spirochaetes could be detected, was not blackwater fever. A striking likeness exists between Spirochaetosis ictero-haemorrhagica as it occurs in Sumatran, European and Japanese cases. There may be some relation between Weil's disease and blackwater fever, but at present these diseases must be strictly kept apart. Snijders expects that future research will throw light on these different types of leptospirae.

W. J. Bais.

Vervoort (H.) **Spirochaeten bij acute koortsige ziekten van onbekenden oorsprong in de tropen. Spirochaetosis febrilis.** [Spirochaetae in Acute Febrile Diseases of Unknown Origin in the Tropics, Spirochaetosis febrilis.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1923. Vol. 63. No. 5. pp. 800-839. With 1 folding chart and 6 graphs. [55 refs.]

This paper contains Vervoort's further observations on this subject (see this *Bulletin*, Vol. 20, p. 583). The author summarizes his conclusions as follows :—

1. Dengue-like fevers (Spirochaetosis febrilis) occurring in Deli (E. C. Sumatra), including a few cases with jaundice, are caused by a leptospira (*Leptospira pyrogenes*), which is pathogenic to guineapigs, causing icterus.
2. It has yet to be decided whether these fevers are caused by one or by different species of leptospira.
3. From the blood of fever patients and sufferers from acute enteritis (pseudo-cholera), coarse spirochaetes have been isolated, as well as from sick horses ; the pathogenicity of these has not been proved.
4. For isolation of the leptospira from the blood the nutrient medium must have a pH value of approximately 6·6, whilst for the transmission of the cultures addition of ascites fluid or serum and haemoglobin appears desirable.
5. The coarse spirochaetes may be cultivated in undiluted human or animal serum.

W. J. Bais.

Gastou (Paul). **Les Spirochaetoses humaines.**—*Rev. Path. Comp. et d'Hyg. Gén.* 1923. Dec. 20. Vol. 23. No. 243. pp. 795-807. [19 refs.]

The author gives a general account of the diseases produced by spirochaetes which are regarded as spirochaetes proper or spirilla. The former he considers as related to the protozoa, the latter to the bacteria. Though a useful summary, the paper contains no new information.

C. M. W.

Noc (Fernand). **Les spirochétoses dans les Colonies Françaises.**—*Congrès de la Santé Publique et de la Prévoyance Sociale. Marseille, 11-17 Septembre 1922. Rapports.* pp. 47-59. [1 ref.]

As the title indicates, this paper deals with spirochaetal infections which occur in the French colonies. It gives a short account of each type of infection and mentions some of the records which have appeared. There is nothing original in the article.

C. M. W.

Zuelzer (Margarete) & Oba (Shiro). **Beitrag zur Kenntnis saprophytischer Spirochäten.**—*Cent. f. Bakt.* I. Abt. Orig. 1923. Oct. 31. Vol. 91. No. 2. pp. 95-101. With 1 plate. [8 refs.]

It has already been noted that water may contain spirochaetes which correspond morphologically with those of syphilis, Weil's disease, relapsing fever and fowl spirochaetosis. Lately a form like *Spirochaeta hebdomadis* of seven-day fever has been found in a similar situation.

Though it resembles *S. icterogenes* (*S. icterohaemorrhagiae*), *S. hebdomadis* is not morphologically identical with it. It is more refractile, thicker, broader and more loosely wound.

Just as the water spirochaetes resemble the pathogenic forms, so do the parasitic saprophytic varieties. The mouth spirochaetes of man resemble forms which occur in water as well as in the intestine of the rabbit and the caecum of guineapigs. The human mouth spirochaete *S. buccalis inequalis* corresponds morphologically with certain intestinal forms of rabbits and guineapigs. In the mouth of man there occurs a form which is peculiar in that the secondary as well as the primary turns are regular and persist during movement. Similar forms are present in large numbers also in the caecum of guineapigs, where also are to be found other spirochaetes resembling *S. dentium* and the finer *S. denticola*, also of the human mouth. The latter organism resembles *S. pallida* and is often referred to as *Treponema denticola*. In certain media, however, it behaves like *L. icterogenes*, and has hooked ends. In stained films the hooked ends are not seen. When like *L. icterogenes* it is with difficulty distinguished from *S. trimerodonta* (syn. *L. trimerodonta* Hartmann), and the two can only be definitely recognised as different when they happen to occur together. It can then be seen that the primary coils of *S. denticola* are looser and deeper than those of *S. trimerodonta*. There is thus considerable difficulty in deciding whether *S. denticola* belongs to the genus *Treponema* or *Leptospira*. It appears simpler and, indeed, more correct to submerge both these genera *Treponema* and *Leptospira* in the genus *Spirochaeta*.

In the mouth as also in the healthy genitalia of human beings there occur organisms which are morphologically indistinguishable from *S. icterogenes*. Morphological resemblance alone is, however, insufficient to establish identity and investigations with the object of testing the relationship of the oral form (*S. trimerodonta*) to *L. icterogenes* are being undertaken. It is possible that the same relationship exists between the harmless spirochaetes of the mucosae and *S. icterogenes* as Uhlenhuth and Zuelzer have shown to exist between the free water living *S. icterogenes* and the strain pathogenic to guineapigs. By mutation and adaptation they may, like the water forms, be able to become transformed from harmless saprophytes into highly pathogenic parasites.

The free living spirochaetes are strict saprophytic organisms which live in dirty water where, through the decomposition of protein in the presence of ammonia, nitrites and nitrates, hydrogen sulphide is freely generated. Such a condition of affairs occurs in the organic felts which form in filters and around the apertures of water taps. Saprophytic spirochaetes often find similarly suitable conditions in the mouth, in decomposing substances in carious teeth, in the intestine, on the mucosae of the genitalia, and in necrotic tissues generally, and in these situations, as is to be expected, more or less dense growths of spirochaetes belonging to the refringens, buccalis, icterogenes, pallida, and recurrent types occur.

Neumann has recently expressed it as his opinion that the purely saprophytic spirochaetes which lead a free existence may acquire pathogenic properties. He mentions two rabbits which he believes acquired genital spirochaetosis through contamination from dung or manure. It appears, however, that if a rabbit has previously suffered from this condition mere scarification of the genitalia will cause a

relapse. It is possible that NEUMANN's cases were examples of this kind and not the result of contamination in the manner he imagined. WORMS claimed to have induced typical genital spirochaetosis in rabbits by inoculating them with *S. dentium* of the human mouth, but here he produced no proof that the organisms which persisted in the wounds were actually pathogenic to the animals. They may have survived in the wounds merely as saprophytes. NEUMANN'S supposition that non-parasitic saprophytic spirochaetes can quickly change in character and become pathogenic is purely speculative. Such changes may occur, but they do so very slowly, as shown by UHLENHUTH and Zuelzer, who found that the water strain of *L. icterogenes* only became pathogenic to guineapigs after it had been cultivated in serum media for 1¼ years. In this case elaborate tests and experiments were carried out to demonstrate the identity of this strain with the natural pathogenic strain of Weil's disease. In NEUMANN'S experiments on the rabbits the possibility of infection of the wounds from the intestine was not excluded, and though it is possible that the free living forms may change as he supposes, the facts show that if this occurs it does so very slowly.

C. M. W.

PARR (Leland W.). **Intestinal Spirochetes.**—*Jl. Infect. Dis.* 1923. Nov. Vol. 33. No. 5. pp. 369-383. [58 refs.]

The paper records observations which the author has made upon intestinal spirochaetes. He finds that these organisms can be demonstrated in about one-third of the healthy persons about Chicago. This means that a much larger number are actually infected, for the spirochaetes are localized in the caecum and ascending colon, and in many cases do not appear in the faeces. With the exception of the rabbit, most laboratory animals harbour intestinal spirochaetes. Neither in human beings nor in laboratory animals have they been found in the ileum at post-mortem examination. In the common infectious diseases of the country they appear to play no part, though in America, as elsewhere, they occasionally seem to play a secondary rôle in certain cases. The intensity of the infection of healthy persons is slight, the spirochaetes representing less than a twentieth of the entire microbial flora. Some persons always excrete some spirochaetes in every stool, while others never show any. They may survive in stored faeces for a period of seven months. A carbohydrate diet does not favour their development in the intestine, and may even cause them to disappear temporarily. The ingestion of sour milk has the same effect. Protein feeding, on the other hand, may favour them if it does not lead to unbalanced metabolism, which has the opposite effect, as also does fasting. Administration of calomel appeared to have no influence on their abundance. Attempts to infect animals were quite unsuccessful. Under certain conditions the spirochaetes may pass through a Berkefeld N. filter. There is no evidence to show that intestinal spirochaetes have a granule phase. It is finally suggested that it is premature to attempt to classify the intestinal spirochaetes, and owing to the fact that HOGUE has demonstrated that one species may show considerable variation in its morphology, it is better at present to refer to all intestinal forms as *Spirochaeta eurygyrata*.

C. M. W.

Delamare (G.) & Achitouv. **Evolution morphologique de spirochètes fécaux cultivés en bouillon-sérum de cheval.**—*C. R. Acad. Sci.* 1923. Dec. 10. Vol. 177. No. 24. pp. 1331-1333. [1 ref.]

In a special medium consisting of a mixture of 250 parts of ordinary broth and 15 parts of inactivated horse serum through which H_2S gas was allowed to pass (presumably just before inoculation and sealing the tubes), impure cultures of intestinal spirochaetes were obtained. These survived for five months, during which a series of morphologically different forms appeared. As a result of the series the authors conclude that the forms known as *Spirochaeta dysenteriae* are the same as *S. vincenti* (Guiart, Abatucci) and *S. eurygyrata* (Brumpt, Castellani), and that *S. microdentium* is identical with *S. stenogyratum*.

C. M. W.

Delamare (G.) & Achitouv. **Spirochétoses intestinales à forme d'entérocolite fétide.**—*Bull. Sanitaire de Constantinople.* 1923. Aug. Nos. 19 & 20. pp. 170-177. With 2 plates.

The paper describes in detail two cases of intestinal spirochaetosis, one of them complicated with amoebic infection. The one which is supposed to be purely spirochaetal, as no pathogenic organisms other than the immense number of spirochaetes were present in the stools, responded at once to intravenous injection of salvarsan. The other case received courses of emetine, intestinal lavage and other treatment, but relapse occurred. Innumerable spirochaetes were eventually found in the stools. The case was then treated with emetine and salvarsan, which brought about a cure. The character of the spirochaetes found in these cases is discussed and they are compared with those described by other observers.

C. M. W.

Sézary (A.) & Pomaret (M.). **L'action Antisyphilitique et Spirillicide des composés Arsénicaux 606, 914, 132 et 190.** *Maroc-Médical.* 1923. July 15. No. 19. pp. 207-209. [4 refs.]

The authors have tested the action of various arsenic derivatives in the case of spirochaetosis in chickens. It was found that when given by intramuscular injection 1 gm. of 606 corresponded with 1·54 to 1·69 gm. of 914 or 132, and with 5 gm. of 190. The preventive and therapeutic efficiency of 190 and 914 given by the mouth were compared, and it was found that, though 190 was decidedly less active than 914 when injected, it was almost equally effective when given by the mouth. It has the advantage over 914 of being more constant in composition and therapeutic value, so that if one can make deductions from the experiments on fowls there is every reason to believe that 190 can be given by the mouth as a prophylactic in syphilis.

C. M. W.

Delpiano (G.). **Un nuovo metodo "fisico" di dimostrazione delle spironemacee al microscopio. (Nota preventiva.)**—*Pathologica.* 1923. Oct. 1. Vol. 15. No. 357. pp. 581-582.

The author describes a new and simple method for the demonstration of spirochaetes. The film to be examined is dried in the air and then immersed for 10 to 15 minutes in distilled or tap water. It is then

dried over a feeble flame and a dry cover glass without mounting material is applied tightly and fixed down with paraffin, or other adhesive material, over the portion to be examined. The film is then examined with the oil immersion lens. The spirochaetes are then clearly visible, as they appear of a dark grey or even black colour. The definition can be improved by manipulation of the condenser. The method was evolved chiefly for the organism of syphilis, but is equally applicable to the spirochaetes of the mouth and those of balanitis. Other organisms, such as cocci and bacilli, can also be identified.

C. M. W.

Selwyn-Clarke (P. S.), Le Fanu (G. H.) & Ingram (A.). **Relapsing Fever in the Gold Coast.**— *Ann. Trop. Med. & Parasit.* 1923. Oct. 13. Vol. 17. No. 3. pp. 389-426. With 1 map & 7 charts. [12 refs.]

The interest of the outbreak of relapsing fever described in this paper is that it is the first of its kind to be recorded from the Gold Coast. The authors believe that the disease may have been introduced into Accra from Dar-es-Salaam, but there the relapsing fever appears to have been tick-borne, while in the present instance it was undoubtedly conveyed by lice. It may have been an off-shoot of the big epidemic which occurred in Senegal and the French Niger Territory in 1921 (see this *Bulletin*, Vol. 20, p. 132). In support of the latter view it appears that some of the earlier cases were infected in the Northern Territories.

Of 158 cases 139 occurred amongst the Zabramah, Northern Territory tribesmen who disbelieve in water as a cleanser of the human body, and in consequence are in a suitable state to harbour lice. In Accra these people live in very insanitary conditions. Clinically the majority of cases were quite typical, though, as in other outbreaks, a number of atypical ones occurred. Some of these were of a very mild nature and might have been taken for slight attacks of malaria, while others were very severe. Only one case ended fatally. A feature of interest of some of the cases was the disproportion between the severity of symptoms and the height of the temperature. In untreated cases relapses occurred with an apyrexial period varying from two to ten days, while in treated and partially treated cases it varied from two to fourteen days. Of a series of 117 cases, 19 per cent. relapsed on one occasion and 6·8 per cent. twice. One case of what appeared to be reinfection occurred. A European became accidentally infected in April from the blood of an infected rat. He developed the disease seven days later and was promptly cured with novarsenobillon. At the end of June he contracted a severe attack of the disease. The second attack, which can hardly have been a relapse, was again cut short by treatment.

Treatment with novarsenobillon was carried out. After one injection the patients were kept in hospital for 14 days. If a rise in temperature above 99° F. took place, another injection was given even if parasites were not found. Most patients (100) received a dose of 0·3 gm., while others (48) had 0·6 gm. Single injections were given to 117 cases, two to 23, while 8 received 3 doses.

As regards laboratory work it was found that monkeys and black and white rats became infected with the strain, but did not relapse ;

guineapigs and rabbits were refractory, while pouched rats became infected and relapsed. The last named animal proved to be much more susceptible to infection than the other animals tested.

Some experiments with bed bugs and stegomyia yielded only negative results. Experiments with lice gave rise to infection. It appears, as French observers maintain, that the disease is not conveyed by the bites of lice nor by their excretions, but by the inoculation of wounds by crushing the lice on the skin.

C. M. W.

NICOLLE (Charles) & CONSEIL (Ernest). **La fièvre récurrente en Tunisie (Epidémiologie et recherches de laboratoire).**—*Bull. Office Internat. d' Hyg. Publique.* 1923. Dec. Vol. 15. No. 12. pp. 1590-1602. [19 refs.]

A general account of relapsing fever in Tunis and the important work which was carried out at the Pasteur Institute on the aetiology of the disease and the demonstration of the mechanism of its spread by lice. All the information has been published in separate papers elsewhere. It may be noted here that the authors believe that the disease does not differ in any way from the European type, and that there is no reason to suppose that it is caused by a distinct species of spirochaete (*S. berbera*). Immunity tests for differentiation of species are unreliable, for it has been shown that monkeys which have recovered from one infection may later on be reinfected with the same strain of organism.

C. M. W.

REITANI (Ugo) & PARISI (Ennio). **Note cliniche su la febbre ricorrente nelle Somalia Italiana.**—*Policlinico.* Sez. Med. 1923. Oct. 1. Vol. 30. No. 10. pp. 514-528. With 4 charts. [42 refs.]

Having had an opportunity of studying an outbreak of relapsing fever in Somaliland, the author gives a description of the disease as it occurred in the cases he observed. It appears to have been quite typical and responded readily to injections of arsenobenzol derivatives.

C. M. W.

MANTEUFEL (P.). **Die kulturelle Anreicherung von Rekurrens-spirochäten als diagnostisches Hilfsmittel am Krankenbett.** [Cultural Enrichment of Relapsing Fever Spirochaetes as Aid to Clinical Diagnosis.]—*Deut. Med. Woch.* 1923. Oct. 26. Vol. 49. No. 43. pp. 1366-1367. [10 refs.]

In many cases of relapsing fever it is impossible to demonstrate the presence of spirochaetes unless one has recourse to animal inoculations. This is often an impracticable procedure, and the author was led to investigate the possibility of applying the culture method to diagnosis purposes. He has discovered a simple enrichment procedure which, in the case of mice, has given good results. A quantity of blood is taken in a sterile glass tube. This is allowed to clot and the clot is separated from the wall of the tube by a platinum wire. One and a-half volumes of a mixture consisting of 80 parts of isotonic salt solution and 20 parts of ordinary peptone broth are added. The tube is then placed in the incubator at 28°-30° C. for 3 or 4 days.

By this time the spirochaetes will have multiplied sufficiently to be recognized. The method has answered in the case of mice, in the blood of which spirochaetes could not be demonstrated, and the author thinks that it will apply to human beings also. He advises the abstraction of 5 cc. of blood to which, after clotting, 7·5 cc. of the mixture of salt solution and peptone broth are added.

C. M. W.

Anding (Curt Emil). **Arsalytbehandlung des Rückfallfiebers im Stadium der Apyrexie.** [Treatment of Relapsing Fever by Arsalyt in the Apyrexial Stage]—*Deut. Med. Woch.* 1923. Sept. 21. Vol. 49. No. 37-38. pp. 1205-1206. [13 refs.]

Various observers have noted that in the treatment of relapsing fever with salvarsan or similar arsenicals the ultimate result depends largely upon the period of the disease at which the injections were made. In a series of 50 cases treated with arsalyt the author noted that the best result from the point of view of immediate cure and prevention of subsequent relapse were obtained when the drug was given on the 5th or 6th day of the afebrile period. In 20 cases treated according to this principle there were no relapses.

C. M. W.

Buschke (A.) & Kroó (H.) **Spinale Strangdegeneration nach experimenteller Rekurrens.** [Degeneration of Spinal Cord Tracts in Experimental Relapsing Fever.]—*Deut. Med. Woch.* 1923. Nov. 16. Vol. 49. No. 46. pp. 1435-1436.

In an earlier paper the authors have shown that in experimental relapsing fever in mice the spirochaetes may invade the brain substance like the organism of syphilis. This invasion was not accompanied by any histological changes. In the case of white rats the infection is often of a different type, the animals remaining ill for many weeks without it being possible to demonstrate spirochaetes in the blood. By inoculation of tissues into other animals it has been proved that spirochaetes were actually present in the brain or other organs. In a small number of such animals the symptoms indicated some derangement of the nervous sytem. Histological examinations showed that in the upper part of the spinal cord there was a selective action on certain neurones and definite disease of the posterior column which involved areas into which fibres from the posterior nerve roots entered. These lesions did not correspond completely with those of tabes, but resemble a condition described by Spielmeyer in trypanosome infections of dogs. Similar degenerations have been recorded in other conditions, such as ergotism and pellagra.

C. M. W.

Illert (E.). **Kultivierung von Recurrensspirochäten in künstlichen Nährmedien unter Berücksichtigung ihrer Virulenz für den Menschen.** [Cultivation of Relapsing Fever Spirochaetes in Artificial Media and their Virulence for Man.]—*Ztschr. f. Hyg. u. Infektionskr.* 1923. Sept. 19. Vol. 100. No. 3-4. pp. 350-356. [11 refs.]

In treating paralytics by infecting them with relapsing fever spirochaetes the virus has been obtained from inoculated mice. It

occurred to the author that it would be convenient if strains of the organism could be maintained in culture provided the virulence was not lost. He has shown that this is possible by the use of Ungermann's medium, which is made as follows. The serum of a young rabbit in quantities of 0·75-1 cc. is placed in small tubes 7 mm. wide and 6 cm. high. The serum is covered with sterile liquid paraffin and inactivated for one hour at 60° C. Immediately before inoculation with spirochaetes a small quantity of fresh rabbit's blood is introduced into the serum by means of a pipette passed through the layer of paraffin. The tubes are inoculated with infective blood or from other cultures by means of a pipette in a similar manner. The culture is incubated at 37° C. The maximum growth occurs at the end of five or six days, when 10-20 spirochaetes will be seen in each dark field. The cultures should be examined after two or three days' incubation, when, if no growth has occurred, other tubes can be inoculated. By this means a strain has been sub-cultured 36 times during seven months. The European strain when inoculated directly from mice to human beings fails to give rise to infection, and the cultural forms are also non-pathogenic. The African strain readily infects man when inoculated from mice or cultures. The virulence of the cultural forms was still maintained after 25 sub-cultures during a period of five months.

C. M. W.

Aristowsky (W.) & Höltzer (R.). **Bemerkungen zur Morphologie der *Spirochaeta obermeieri*.—*Cent. f. Bakt.* 1. Abt. Orig. 1924. Jan. 14. Vol. 91. No. 3-4. pp. 175-181. With 1 plate.**

The authors have been able to maintain cultures of *Spirochaeta obermeieri* for a year and a-half, during which it has passed through 200 generations of sub-culture. Two different media were used. One was made by adding to 8 cc. of physiological saline solution 4 cc. of the serum of young horses and a piece of the blood clot from the same animal or of man. The other medium was similar, but in place of the clot a piece of the white of a hard boiled egg was used. When a culture is commenced tubes of both media are inoculated with 1-3 drops of infected blood. The tubes are plugged with cotton wool and incubated at 35° C. As a rule sub-culture has to be made every 48-72 hours. If growth occurs in the one medium it is well to sub-culture into both media. Maximum growth occurs on the 2nd to the 4th day, after which signs of degeneration appear in the spirochaetes. Marked variation in size of the organism is a notable feature. They may have as many as fifty coils or only three or four. The largest forms occur in the second medium, especially when several successive sub-cultures have been made in it. When the long forms are numerous sub-culture often fails. In other cultures the shorter forms predominate, while in old cultures from the 5th day onwards "shadow forms," which are finely granular, appear. Sub-culture of cultures rich in small forms often fails, but when successful long forms tend to appear. The authors disagree with observers who claim that the small forms are young, active ones. Apparently unfavourable conditions may give rise to short or long forms. The most healthy forms are those with 10-12 turns like the blood forms. Cultures rich in these are best for sub-culture purposes.

Though reproduction by division into two is the rule, division into 3 or 5 parts commonly occurs.

As regards the character of the spirochaetes, many are regularly coiled. Others, however, show irregularities or are entirely devoid of coils. The irregularly coiled spirochaetes are most active when observed by dark-ground illumination. Occasionally a dividing form will be seen with one half coiled and the other half devoid of coils. Besides the shadow forms, degenerating cultures show structurally normal but non-motile forms, on many of which are curious centrally-placed bodies which appear as minute rings under the dark field and as intensely violet spheres when stained by Giemsa stain. Every transition between the shadow forms and normal spirochaetes occurs.

In some cultures clumps of spirochaetes are found. These are formed first by two organisms becoming attached, and gradually, by the addition of others, clumps of 10 or more individuals are formed. Similar clumps occur in the blood towards the end of a febrile period, and their formation is usually attributed to the presence of agglutinins in the blood. As they occur in cultures this explanation can hardly be correct. It seems that in a series of sub-cultures this clumping appears periodically, and as the cultures containing them are readily sub-cultured it does not appear as if the phenomenon is one of degeneration. The coiling of the spirochaetes into rings has been observed occasionally. Many explanations of this have been advanced, but the authors can offer none. They have seen it only in 3 or 4 of the 200 sub-cultures.

It is evident that the cycle of development in cultures reveals periodic variations. The strain for a time will only show 3-5 spirochaetes per field, while in later sub-cultures the number is increased to 30 or 40. Later still it will revert to the smaller number. A similar periodicity is observed in the appearance of clumps and other features. The authors believe that this periodicity is an indication of a definite life cycle, and that the periodicity of the disease in man is dependent, not upon the development of immunity, as is generally supposed, but upon the cycle of development of the parasite.

C. M. W.

RODHAIN (J.). **Sur la réceptivité des roussettes épaulières,** *Epomophorus Wahlbergi Haldemani* **Hallowell et** *Micropteropus pusillus* **Peters au** *Spirochaeta Duttoni* **Todd.**—*Bull. Soc. Path. Exot.* 1923. Dec. 12. Vol. 16. No. 10. pp. 729-733. [1 ref.]

In an earlier paper (this *Bulletin*, Vol. 19, p. 556) VAN DEN BRANDEN and VAN HOOF showed that the fruit bat, *Eidelon helvon*, could not be infected with the spirochaete of African tick fever. The authors have experimented with other bats in the Congo. These were *Epomophorus wahlbergi haldemani* and *Micropteropus pusillus*. Both, especially the latter, are readily infected by inoculating them either with crushed ticks or with infected blood, and the disease produced is a fatal one.

C. M. W.

Journal of the Royal Naval Medical Service. 1924. Jan. Vol. 10. No. 1. p. 40.—**Naval Medical History of the War. Section of Tropical and Sub-Tropical Medicine. Part VI.—(iii) Typhus and Relapsing Fever.**

Though relapsing fever and typhus were very prevalent at the naval base in Bessarabia during the spring of 1917, by strict anti-vermin rules the force was kept entirely free from both diseases.

C. M. W.

Risquez (Jesus Rafael). **La Espiroquetosis bronquial en Venezuela.**—*Gac. Méd. de Caracas.* 1923. July 15, 31, Aug. 15, 31, Sept. 15 & 30. Vol. 30. Nos. 13, 14, 15, 16, 17, 18. pp. 193-197; 209-219: 225-227; 241-245; 257-265; 273-283. With 2 maps & 2 coloured plates. [42 refs.]

This series of papers comprises a full account of bronchial spirochaetosis in all its bearings as it occurs in Venezuela. The question is dealt with in four parts, each with chapters and sub-headings.

Part I. treats of the history of the disease in different countries and in Venezuela in particular. The first case recorded in Venezuela was by Luciani in 1919; since then there had been 8 others, and the author now brings forward 66 more. The morphology and the position of the parasite in the animal kingdom are next discussed.

In Part II. a general account of the disease is given. Of the 66 cases, 38 were males and 28 females. Thirty-nine were between the ages of 22 and 32 years. A large proportion had suffered previously from catarrhal affections of the throat and respiratory tract, and in 4 per cent. tuberculosis was associated. Cough was a prominent symptom, often accompanied by pain in the chest. The expectoration was viscid, usually fetid and in a third of the cases blood-stained. At the onset there was fever which often led to a diagnosis of influenza. The author next discusses the question as to whether bronchial spirochaetosis is a distinct clinical entity and decides in the affirmative on the following grounds: 1. The organism differs from the ordinary mouth spirochaetes in several particulars—motility, production of coccoid forms, staining properties, etc.; 2. It is not found in healthy subjects nor in patients with ordinary catarrh; 3. It disappears as the symptoms clear up.

In this part the morphology is again considered and in greater detail. From examination of 100 specimens the average length was 8·4 microns, and the number of turns 4·72. The prognosis is, on the whole, favourable, though many cases become chronic, but no deaths resulted among the 66 recorded here.

Part III. is concerned with treatment. The most satisfactory is that by intravenous tartar emetic. A 1 per cent. solution is used and the initial dose is 0·5 cgm., increasing daily to a maximum of 8 cgm., a total of 0·5-1·5 gm. being given in 50-60 days.

The same drug has also been given by mouth in a dose of 5 mgm. with codeine, or with iodide of potassium, or with syrup of tolu and chloroform water. Other drugs employed were arsenic in the form of Fowler's solution (maximum dose 10 minims) or neosalvarsan, 0·15 gm. daily.

Part IV. gives details of 32 cases, their histories, physical condition, symptoms, diagnosis and details of treatment. Finally, there is

a general summary of the results of examination of the sputum of the two hundred patients, which may be tabulated thus :—

	Men.	*Women.*	*Children.*	*Total.*	*Percentage.*
With Spirochaetes only ..	24	31	3	58	29
With B. tuberculosis only ..	24	22	0	46	23
With Spiroch. & B. tuberc...	4	4	0	8	4
With neither Spiroch. nor B. tuberculosis	44	39	5	88	44
TOTALS	96	96	8	200	

H. Harold Scott.

LABERNADIE (V.) & PEYRE (E.). **Apparition de la broncho-spirochétose en Guyane française.**—*Bull. Soc. Path. Exot.* 1923. July 11. Vol. 16. No. 7. pp. 476-478.

The paper is a record of the first case of spirochaetal bronchitis to be observed in French Guiana. There was an irritating cough with blood-stained expectoration consisting of serous fluid with islets of mucoid material in which spirochaetes were numerous. Repeated search for tubercle bacilli and eggs of Paragonimus were negative. The patient also suffered from benign tertian malaria. Treatment with quinine and symptomatic remedies to ease the cough were the only ones adopted, as the case was a mild one.

C. M. W.

RAT BITE FEVER.

Low (George C.). **A Case of Rat-Bite Fever in England. Recovery of the Spirochaete from the Blood.**—*Brit. Med. Jl.* 1924. Feb. 9. p. 236.

According to the author, the case was of interest because of its typical clinical signs and the fact that the specific germ was isolated. As regards the organism the author states that Wenyon says it is not a *Leptospira* and that probably it will have to be included in the *Spironema* group. [As a matter of fact, the reviewer did not suggest the *Spironema*, but the *Spirillum* group.]

C. M. Wenyon.

Fróes (Heitor Praguer). **Considerações sobre o Sodóco.** [Rat-bite Fever.]—*Brazil Medico.* 1923. Dec. 8. Year 37. Vol. 2. No. 23. pp. 339-341.

An account of a fatal case of fever of a relapsing fever type in a woman aged 60 years who had an unhealed wound on the dorsum of the foot, the result of a rat bite. From the clinical picture rat bite fever was diagnosed, this being the sixth case to be recorded from Brazil.

C. M. W.

Ciaccia (Salvatore). **Contributo clinico alla conoscenza del sodoku.**—*Pediatria.* 1924. Jan 15. Vol. 32. No. 2. pp. 92-100. With 1 text fig. and 1 chart. [27 refs.]

A detailed account of a case of rat-bite fever in a child in Italy. The illness lasted for about two months and a cure was effected by intramuscular injections of neargirol. The temperature, which was taken throughout, is shown in an instructive chart. Attempts at discovery of the organism in the blood failed, though on one occasion urine, which was taken with precautions to exclude contamination, contained a spirochaete somewhat larger than *Treponema pallidum*.

C. M. W.

Giraldi (Stefano). **Due casi di Sodóku.**—*Policlinico.* Sez. Prat. 1924. Jan. 14. Vol. 31. No. 2. pp. 44-47. [10 refs.]

A description of two cases of rat-bite fever in Italy in which the organisms were not discovered.

C. M. W.

Bezzi (Giovanni) & Moratti (Nello). **Un caso di Sodóku.** *Policlinico.* Sez. Prat. 1924. Jan. 14. Vol. 31. No. 2. pp. 48-49. [5 refs.]

A record of a case of rat-bite fever in a child seven years of age.

C. M. W.

INFECTIOUS JAUNDICE.

Schüffner (W.) & Kuenen (W. A.). **Het voorkomen van spirochaeten van het type der** *Sp. icterohaemorrhagiae* **bij ratten in Amsterdam.** [Occurrence of Spirochaetes of the Type of *Sp. icterohaemorrhagiae* among Rats in Amsterdam.]—*Nederl. Tijdschr. v. Geneesk.* 1923. Nov. 17. 67th Year. 2nd Half. No. 20. pp. 2018–2026. With 1 fig. & 1 plate. [18 refs.]

One hundred and twenty-four adults of *Mus norvegicus* (length without tail exceeding 200 mm.) were found infected to the extent of 45 per cent. with leptospira, 83 young ones (under 200 mm.) to the extent of 2 per cent., and 29 *Mus rattus* from ships to the extent of 3 per cent. The incidence of *Tryp. lewisi* among these 3 groups was respectively 11, 16 and 17 per cent. It is pointed out that this low incidence among the young ones is surprising, considering the high chance of infection to which they are exposed.

Within the kidneys of naturally-infected rats, the leptospirae are not evenly distributed, but are localized in distinct foci. Moreover, they are not situated within the tissue (as in guineapigs, infected experimentally), but are to be found in the lumen of the tubuli contorti, where thick layers of leptospira cover the epithelium. The renal infection may be the last stage of a former generalized infection (like the infection of the gallbladder in typhoid), but it might also be the result of an ascending infection, starting from the urinary tract and stopped by the barrier of the renal epithelium.

Several guineapigs were successfully inoculated with the murine leptospira. They died after 6-14 days, on first subinoculation after 7-8 days, on second subinoculation after 6 days. Haemorrhages and icterus were usual, sometimes without leptospirae being found. The leptospirae are found principally in the liver if death supervene very quickly; otherwise the kidneys harboured most of them. Spirochaeturia did not occur before the 7th day. In surviving animals it continued for more than three months. Inoculation of young rats caused no illness, but three of them developed spirochaeturia, lasting more than three months.

Tap water was found to contain spirochaetes of the leptospira type.

N. H. Swellengrebel.

Kai (Toshihiko). [**Ueber die Resistenz der roten Blutkörperchen bei Spirochetosis ictero-haemorrhagica japonica.**]—*Fukuoka Ikw. Daig. Z.* 1921. Vol. 14. pp. 513-564. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 1. p. 69.]

The author arrives at the following conclusions :—

1. In the febrile stage the resistance of the red blood corpuscles is increased against hypotonic saline solution but decreased against saponin. The degree of resistance is chiefly dependent on the fever and jaundice.

2. The above changes become more marked with the advent of jaundice and bear a direct relation to its intensity and to the degree of anaemia.

3. During convalescence a return to the normal takes place gradually.

4. There is a direct connection between the degree of change in resistance of the red blood corpuscles and the severity of the disease.

C. M. Wenyon.

Toyama (Yuzo). **[Results of the Experiments for destroying *Spirochaeta icterohaemorrhagiae* from the Agricultural Point of View in Toyama Prefecture.]**—*Jikken Ig. Z.* Tokyo. 1921. Vol. 5. pp. 14-28. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 2. pp. 201–202.]

—— **Result of the Prophylaxis of Weil's Disease (*Spirochätosis icterohaemorrhagica*) experimented both in Toyama and Chiba Prefectures.**—*Scientific Reports from Govt. Inst. for Infect. Dis., Tokyo.* 1922. Vol. 1. pp. 197–201.

The prevalence of Weil's disease is closely associated with conditions of the soil, and in Japan all infected districts are paddy fields or localities with swampy ground. It was noted that owing to the number of cases which occurred farmers became reluctant to work the fields. Having determined that the organism causing the disease will survive in experimental paddy fields, the author experimented with various fertilizers with a view to finding one which destroyed the organism. Calcium cyanamide was found to be a satisfactory agent. A practical test was carried out by selecting three areas known to be heavily infected and applying the chemical to the extent of five "kwan" per "tan" (18·78 kilogrammes per 991·73 sq. metres). The areas chosen varied in extent from about 26 to 47 hectares—the observations extended over seven months. The average number of daily workers on the three fields were 236, 462 and 120. After the soil had been treated in the three areas only a single case of the disease occurred in one of the areas, while in the surrounding fields it was as prevalent as before. Furthermore, the use of the chemical improved the yield of rice, but it is admitted that this good result cannot be attributed entirely to the use of calcium cyanamide, for other fertilizers were used as well.

C. M. W.

Pettit (Auguste). **Conservation du virus de la spirochétose ictéro-hémorragique.**—*Bull. Acad. Méd.* 1923. Nov. 6. Year 87. 3rd Ser. Vol. 90. No. 37. pp. 310–312.

The author discusses the difficulties of keeping strains of *Spirochaeta icterohaemorrhagiae*. Neither in cultures nor in inoculated guineapigs can one be sure that multiplication will take place. For some reason or another cultures will suddenly fail, while guineapigs, especially such as have been employed previously for the titration of therapeutic sera, will not respond to inoculation. The animals may die of intercurrent infections which kill the subinoculated animals. In such cases the spirochaete can sometimes be recovered by inoculating the urine found in the bladder after death; it is less likely to be infected with the intercurrent organism. By combining both the culture and inoculation methods there is a reasonable chance of maintaining a strain. By this means one has been kept since September 1916.

C. M. W.

BEGER (H.). **Ueber aktive Immunisierung mit "gekupferten" Spirochätenkulturen bei der Weilschen Krankheit.** [Immunization with Copper-treated Spirochaete Cultures in Weil's Disease.]—*Cent. f. Bakt.* I. Abt. Orig. 1923. Oct. 31. Vol. 91. No. 2. pp. 90–95. [15 refs.]

By the adoption of LAUBENHEIMER'S method* of killing organisms for vaccine purposes the author has been able to prepare a vaccine of *Leptospira icterohaemorrhagiae* in which the organisms are killed without the damage which always results if other methods such as heat are employed. By immersing in the suspension of organism a piece of copper foil they are all killed in the course of 4 or 5 hours without having altered structurally. By the use of such a vaccine administered intraperitoneally to guineapigs the animals may be completely immunized against subsequent inoculations with highly virulent strains of leptospira.

C. M. W.

OBA (S.). **Ueber das Agglutinin von** *Spirochaeta ikterohaemorrhagiae*, **insbesondere eine Nachweismethode dafür und die Agglutininuntersuchung bei der experimentellen Weilschen Krankheit des Kaninchens.** [The Agglutinin of *S. icterohaemorrhagiae*, its Demonstration and Study in Experimental Weil's Disease in the Rabbit.]—*Aichi Jl. Experim. Med.* Nagoya. 1923. Mar. 31. Vol. 1. No. 1. pp. 1–20. [17 refs.]

——, KATAYAMA (T.) & SUMI (K.). **Die Identifizierung der** *Spirochaeta ikterohaemorrhagiae* **und** *Spirochaeta hebdomadis* **mittels des Agglutinationsverfahrens.**—*Ibid.* pp. 20–28. [3 refs.]

These two papers deal with the phenomenon of agglutination of *Spirochaeta icterohaemorrhagiae* and *S. hebdomadis*. The first paper, which deals with the former organism, finishes with the following conclusions :—

1. The agglutination of *Spirochaeta icterohaemorrhagiae* can be demonstrated by the addition of an homologous serum to the culture of the organism in a serum agar medium. The spirochaetes cease to move and form thick clumps of motionless individuals so that they can be easily distinguished from those in the control culture.
2. Heating the serum for two hours at 60°C. on three successive occasions has no effect on the agglutination, whereas heating at 70°C. for 60 minutes destroys the agglutination to a large extent.
3. The normal sera of men, horses, sheep, goats, rabbits, dogs, guineapigs, white rats, and chickens possess no substances which agglutinate *S. icterohaemorrhagiae*.
4. Large rabbits weighing over 2,000 gm. become ill after the intrahepatic injection of fairly small doses of the organism.
5. In experimental Weil's disease of rabbits the agglutinin appears in the blood after ten days and reaches its maximum in four weeks. It is clearly demonstrable in the blood for over four months.

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*LAUBENHEIMER (K.). Über die Einwirkung von Metallen und Metallsalzen auf Bakterien und Bakteriengifte. Versuche zur praktischen Verwertung der oligodynamischen Wirkung von Metallen.—*Zeitschr. f. Hyg. u. Infektionskr.* 1921. Mar. 5. Vol. 92. No. 1. pp. 78–114.

6. The demonstration of the agglutinin value of a serum by this method reaches approximately the same standard of reliability as does the usual agglutination test as applied to motile bacilli like those of typhoid.

The second paper describes the differential agglutinins of the two organisms. *S. hebdomadis* behaves with its homologous serum like *S. icterohaemorrhagiae*, but each is strictly specific for its corresponding serum. A rabbit may have in its blood at the same time and independently both agglutinins, while both organisms can be recovered from the blood of a rabbit three days after intrahepatic inoculation. Rabbits immunized against one of these organisms are refractory to inoculation with this organism alone and are not protected against the other.

The technique of performing the agglutination test is described in detail. In each of a series of test tubes are placed 2 cc. of a weak agar (·4–·5 per cent. agar in Ringer's solution). These are sterilized in the steamer and then placed in a water bath at 37° C. To one tube is added ·5 cc. of immune serum of a rabbit or, if human serum or that of an animal other than the rabbit is used, ·5 cc. of normal rabbit serum as well. The volume of the liquid in the tube is then doubled by the addition of an equal part of the melted agar. To other tubes normal rabbit's serum is added in the place of the immune serum. Before the tubes have set they are inoculated with a drop of culture or with infected blood. In the first tube after incubating for 2 to 3 days at 37° C. will be found clumps of agglutinated motionless organisms, while in others the organisms are motile and scattered.

C. M. W.

Laroche (Guy) & Dauptain. **La réaction du benjoin colloïdal dans la spirochétose ictéro-hémorrhagique.**—*C.R. Soc. Biol.* 1923. Oct. 27. Vol. 89. No. 29. pp. 870–871.

In a case of Weil's disease which was complicated by severe meningeal symptoms and the presence of much albumen, bile pigments and cells (200 per cubic millimetre) in the cerebrospinal fluid, the benzoin colloidal reaction* was tested on two occasions. In spite of the intensity of the lymphocyte reaction and the presence of bile pigments the reaction was quite negative.

C. M. W.

Leconte (M.) & Joltrois. **Un cas de spirochaétose ictéro-hémorragique avec iritis et névrite optique.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1923. Oct. 25. Vol. 39. 3rd Ser. No. 29. pp.1366-1369.

A case of Weil's disease is described in which the usual congestion of the conjunctiva was followed by more serious ocular disturbance in the shape of iritis and optic neuritis. It is supposed that the involvement of the eyes was consequent upon meningeal complications.

C. M. W.

Oba (Shiro), Katayama (Takeichi) & Washimi (Kenichi). [**On the Differential Diagnosis of** *S. icterohemorrhagica* **and the Spirocheta of Seven-Day Fever by Agglutination Test.**]—*Eisei. Densen. Z.* Tokyo. 1921. Vol. 17. pp. 59–66. [Summarized in *Japan Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 2. p. 193.]

Oba (Shiro). [**On Agglutinin of** *Spirochaeta icterohemorrhagica.*]—*Eisei. Densen. Z.* Tokyo. 1921. Vol. 16. pp. 172–203. [Summarized in *Japan. Jl. Med. Sciences.* Tokyo. 1922. Vol. 1. No. 2. p. 193.]

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* The colloidal benzoin test of the cerebrospinal fluid is described by Wright (H. D.) and Karmack (W. O.) in the *Edinburgh Med. Jl.* 1923. Aug. Vol. 30. pp. 352–367.

YELLOW FEVER.

White (R. O.). **Yellow Fever in the Gold Coast ; Its Endemic and Epidemic Character.**—*Ann. Trop. Med. & Parasit.* 1923. Oct. 13. Vol. 17. No. 3. pp. 431–437. [5 refs.]

The author believes that the outbreak which occurred in different parts of the Gold Coast in 1923 was undoubtedly yellow fever. In all cases there was black tarry or coffee-grounds vomit, marked diminution in the quantity of urine—amounting in some cases to complete anuria—albuminuria associated with symptoms of extreme urgency, followed rapidly by death. Post mortem there was fatty degeneration of the liver and kidneys. Other symptoms recorded were haemorrhage from the mucous membranes, conjunctival injection, varying degrees of jaundice, Faget's sign and high fever. With one exception the fatal termination occurred within a week of the onset of illness.

There is not the slightest ground for believing that the disease was imported, so that it must be assumed that yellow fever exists in W. Africa in some latent form requiring special conditions for its development. That such are required may be gathered from the infrequency with which Europeans are attacked, notwithstanding that the factors for the spread of yellow fever—the virus, the carrier and the non-immune—are always present. It was supposed that the European was protected by mild and unrecognized attacks, but this is ruled out, for individuals have succumbed to it after thirty years' residence. The European is the obvious non-immune, yet the records of yellow fever epidemics show that long intervals occur between outbreaks in any one place and that they are all traceable to a non-European source. The disease when it attacks Europeans is invariably fatal and is of such a character that it cannot be overlooked, while the intervals that elapse between outbreaks amongst them are proof that Europeans are not responsible for the fact that yellow fever is endemic in W. Africa. On the other hand, the indigenous native, dissociated from the new-comer, is incapable of maintaining the virus. So long as the native remains in his own district he is relatively immune, but directly he moves to another locality this immunity breaks down and he becomes more susceptible to yellow fever. He contracts the disease in a mild form which, however, gives the virus an impetus. Ultimately it becomes so enhanced as to give rise to definite illness. Finally, when living conditions make it possible, it is handed on to Europeans. The strain at this stage has reached a high degree of virulence, and if the disease is not checked by mosquito control will be capable of infecting the otherwise insusceptible native.

The infected native rather than the infective mosquito is responsible for the spread of the disease. If the former can be kept from close living contact with the European there is reasonable prospect of preventing the outbreaks. Efforts at controlling the mosquito have hitherto met with little permanent success, though temporarily the Stegomyia index of 80 per cent. can be reduced to 5 per cent. by a week's intensive work. The effectiveness of such measures suggests the advisability of instituting a " cleaning-up " week at least once a year in every town where cases of yellow fever have been known to occur within the last twenty years.

C. M. Wenyon.

Gouzien (P.). **Manifestations amariles au Dahomey et en Guyane française, en 1923.**—*Bull. Office Internat. d' Hyg. Publique.* 1923. Dec. Vol. 15. No. 12. pp. 1565–1570. [1 ref.]

In the two colonies mentioned in the title small outbreaks of yellow fever occurred in 1923. By immediate sanitary measures these were cut short. At Dahomey there were five cases amongst Europeans, four of which proved fatal. An enquiry showed that the small epidemic was not the result of importation of infection by ships. The natives are not immune, as is often supposed, while the European affords only an apparent link in the yellow fever chain. Natives suffer from diseases associated with jaundice which might legitimately be diagnosed yellow fever. The case of a native child two years of age, who died after an acute illness associated with violent bilious vomiting and evacuation per rectum of blood, is mentioned. A similar case in a child was seen by the author during the epidemic in the Sudan in 1906. A few days later an employee in the postal service died of yellow fever. It seems probable that both the children suffered from the disease in an atypical form. The author emphasizes the difficulties in dealing with natives in such matters. Their superstitions are a serious handicap to proper surveillance. The cause of the 1923 outbreak at Dahomey was not determined, but it is reasonable to suppose that it was carried there by road in unrecognized form in natives possibly from the Gold Coast. The author believes that if it were possible to live intimately with the native and follow his daily life cases of yellow fever, modified in various ways according to age and other circumstances, would quickly come to light.

As regards the Guiana cases, there were two of these, one in a European and the other in an Arab. In spite of careful enquiry it was impossible to discover the origin. Not a single case had been recorded from this country since 1892. The author recalls the fact that a characteristic case of yellow fever was noted in Martinique in 1921 and that this colony is visited almost yearly by an "inflammatory fever" which differs from yellow fever in being less severe and in having a lower mortality rate.

The author believes that yellow fever is maintained amongst the natives, who suffer in a modified degree, and that the disease exists in other forms than the typical one, so that definite diagnosis becomes exceedingly difficult. The control of yellow fever demands constant vigilance and a system of exchange of information between the countries interested.

C. M. W.

Vieira (Borges). **Pesquisas sobre a febre amarella na Bahia. (Conferencia feita na Sociedade de Medicina e Cirurgia de S. Paulo.)** [Researches on Yellow Fever in Bahia.]—*Ann. Paulist. Med. e Cirurg.* 1922. Mar. Year 10. Vol. 13. No. 3. pp. 59–72. With 9 charts in text.

This is an interesting account of researches into an outbreak of yellow fever in Bahia in 1921. From the description of the disease there would appear to be no doubt as to its nature, all the typical symptoms of yellow fever being present. The following researches were undertaken: 1. Isolation of the *Leptospira icteroides*. Blood was obtained from 7 patients; 3 on the fourth day, 3 on the fifth, and 1 on the second and again on the fourth. The last case terminated

fatally. Neither by direct dark-ground examination, by inoculation into guinea-pigs, nor by cultural methods were positive results obtained.

2. Pfeiffer's reaction with sera of patients recently attacked and cultures from NOGUCHI's laboratory. Seven were thus tested, 4 benign cases, 2 of average severity, and 1 grave. All proved negative.

3. The use of *L. icteroides* vaccines and antisera. Nothing of importance could be deduced from the use of the former. The latter was injected in a dose of 15 cc. intravenously into a child of 10 years on the 16th day of disease. Though the injection was well tolerated death occurred three days later.

The author concludes either that the disease was not yellow fever, though the symptoms appeared typical and the diagnoses were made by those who had had experience of this disease, or that the causal agent was not the leptospira isolated by NOGUCHI, or, lastly, that some defect in technique had led to the persistently negative results in his hands. From the description given, however, every care seems to have been taken both in obtaining the materials and in carrying out the tests.

H. Harold Scott.

DENGUE.

Knowles (R.) & Das Gupta (S. A. S. Biraj Mohan). **On a Pseudo-Organism in the Blood in Dengue.**—*Indian Med. Gaz.* 1924. Jan. Vol. 59. No. 1. pp. 11–26. With 6 figs. and 4 charts. [21 refs.]

Though the painstaking investigations described in this paper finally led to the conclusion that the spiral structures seen by the authors in the blood of dengue patients in Calcutta, at first thought to be leptospira, were in reality nothing more than artifacts, they serve a most useful purpose in indicating the difficulties surrounding such an enquiry and sound a note of warning to others who may casually discover similar structures in the blood of patients suffering from dengue or any other febrile disease. Not only were these pseudo-spirochaetes found in the blood of dengue patients but they occurred also in primary cultures in the Wenyon-Noguchi medium made with rabbits' or human blood, in rabbits and monkeys (but not in guineapigs) inoculated with the blood of dengue patients and in cultures from these animals. There appeared, therefore, very good reason to suppose that a true organism was under observation. Several disconcerting features, however, revealed themselves. It was not possible to obtain stained preparations of the supposed organism from the blood of patients or from inoculated animals, though stained films of the cultures revealed them. Their morphology, however, was different in the stained films from that in the fresh dark-ground preparations. Though present in primary cultures they did not appear in sub-culture. The direct examination of healthy human beings failed to reveal the possible organism though cultures of the blood were positive. On the other hand, the blood of uninoculated monkeys and rabbits contained them as also did cultures from these animals. It was noted that the animals in which they were found were running an irregular temperature. A case of subtertian malaria also revealed them. It was then discovered that if the defibrinated blood of a healthy person was kept in the water bath at 41° C. the same structures appeared in 2 to 3 hours. It was evident therefore that the spiral structures could not be regarded as an organism. One of the writers clinched the matter by submitting himself to inoculation with one of the apparently positive cultures. He remained well and none of the structures appeared in his blood. They were found in the blood in the stomach of Culex mosquitoes taken from dengue houses and in the mid-gut of *Aëdes* (*Stegomyia*) *aegypti* fed 21 hours before.

The structures at first mistaken for leptospira varied in length from 4–20 μ but usually measured 8–9 μ. They were brightly refringent when compared with other pseudo-spirochaetes or "erythrocyte streamers." They were fairly flexible, and a form of 8–9 μ in length would show 10-12 regular and symmetrical turns. They were actively motile with movements of forward and backward progression, and they would often dive down into the fluid and then come up again. Their most characteristic feature, however, was the invariable presence at either or both ends of what appeared to be a bead or spore larger than the diameter of the filament and more refractile. In the stained films they had a different appearance and in shape resembled the long Old English letter S. In an instructive plate reproduced here the authors figure what they call the puzzles and fallacies of dark-ground examination of the blood.

The authors describe these leptospira-like artifacts as novel, but they must be perfectly familiar to those who have examined rats for *L. icterohaemorrhagiae* or have worked with cultures of this organism, the movements of which are much more actively progressive and rotary than those of the filaments. Apparently the authors did not have cultures of true leptospira for purposes of comparison. Had these been available they would undoubtedly have been struck by the definite differences between true leptospira and the filaments.

A

Dark ground appearance of puzzles and fallacies in blood examination.—(After Knowles & Das Gupta, from *Indian Medical Gazette*.)

B

Dark ground appearance of a field containing *Leptospira icterohaemorrhagiae* from a culture in blood medium. (Original.)

(Both × 1000.)

Attention is called to the exhaustive investigation on dengue conducted by Chandler and Rice in America. These observers failed entirely to discover a leptospira in their cases (this *Bulletin* Vol. 20, p. 804). The mistake made by Chambers (this *Bulletin* Vol. 2, p. 371) is also mentioned. This observer described as a new spirochaete in human blood the same filaments which gave rise to so much doubt in the present investigation, and the authors are inclined to agree with J. G. Thomson that the leptospira discovered in cases of blackwater fever by Blanchard and Lefrou may be similar artifacts. It is to be hoped that at the present time, when so much interest is taken in leptospira, other workers before publishing their results will follow the authors of the paper in demanding convincing proof of the nature of any suspicious structures they find in blood.

C. M. Wenyon.

de Faria (J. Gomes). *Leptospira couvyi*, **chez un malade suspect de dengue.**—*C. R. Soc. Biol.* 1924. Jan. 18. Vol. 90. No. 1. pp. 55–56. [1 ref.]

A case of dengue was examined about two hours after the onset of symptoms. Blood films stained by Leishman stain showed four structures which the author considered to be leptospira. They were six to nine microns in length and all the four had one end or both ends

hooked. They tended to be thicker in the middle than at the extremities, and the thickened portion was seen to be twisted in a very close spiral. The long axis was not straight but was bent two or three times in broad curves. The staining was very faint. Structurally therefore they correspond with leptospira, but it is unfortunate that no further proof by inoculation of animals, culture, or even observations on the fresh blood by dark ground illumination is put forward. The name *Leptospira couvyi* is given to the supposed organism. [In view of the paper by KNOWLES and GUPTA reviewed above, it will be well to keep an open mind regarding *Leptospira couvyi*.]

C. M. W.

MALARIA.

CHRISTOPHERS (S. R.). **Enquiry on Malaria, Blackwater Fever and Anchylostomiasis in Singhbhum. Report No. 1. Preliminary Investigation into the Conditions on the Bengal Iron Company's Mines at Manharpur, January, 1923.**—37 pp. With 6 maps and 4 figs. 1923. Patna: Supt. Govt. Printing, Bihar and Orissa.

The amount of material collected during this three weeks' inquiry in the cold non-malarial season is phenomenal and the matters of general interest considerable. The average haemoglobin was 10 per cent. less in those with palpable spleens than in those without. Spleen and parasite rates are treated both quantitatively and qualitatively. Qualitative measurement of the spleen rate in children is obtained by calculating the length of its exposed portion in centimetres as if it belonged to a child of six—with its average sitting-height of 60 cm.; of the parasite rate by spreading 10 cmm. of blood as a thick film on 2 square cm. of slide and examining 200 random fields [of undeterminable size] with the square aperture of the Ehrlich eyepiece. For ages 1–2, 3–5, 6–10, and 11–15, the spleen rates were characteristic of hyperendemic areas, namely, 73, 80, 71, and 46; when the spleen was palpable the average corrected palpable enlargements for these ages were 2·6, 4·5, 3·9 and 3·6 cm. Regarding the qualitative parasite index the number of rings per cmm. varied in 140 cases from 4 to 134,232, six-sevenths of the total number of parasites being harboured by those who by birth or immigration had dwelt in the place for 2 years or less.

ROSS and THOMSON (1910) found that 200 to 500 *Plasmodium vivax* and 600 to 1,500 *P. falciparum* per cmm. are required to cause a malarial attack. If this number be conservatively and conveniently raised to 5,000 it is calculated that each child below 2 would be under "attack" conditions for about half its life. Its probable after-history is indicated in the accompanying table:—

Age.	Spleen rate.	Parasite rate.	Average number of parasites per cmm.	Frequency of attack.
1 to 2 ..	75	100	12,629	Almost continuous.
3 to 5 ..	88	95	1,320	Once in 25 days.
6 to 12 ..	71	86	1,018	Once a month.
12 to 16 ..	46	50	198	Once a month.
Adult ..	11	50	122	Once in 6 months.

It would seem then that the intense infection of infancy results in a considerable measure not merely of tolerance but of true immunity. The local measures advised to combat this local hyperendemism, with occasional blackwater fever, are wisely tentative.

Anaemia in the labourers is probably largely attributable to ankylostome infection. In 50 persons 0·02 gm. of whose stools was examined [evidently as a squash or smear] ova were not found in 36 per cent. They were estimated as under 100 per gm. in 14, 100 to 500 in 16, 500 to 1,000 in 10, 1,000 to 2,000 in 10, 2,000 to 5,000 in 2, and over 5,000 in 2 per cent.

The mere attempt to deal exactly with these various parasitic factors makes this valuable inquiry one which deserves wider publication and better editing than its present form implies.

Clayton Lane.

GILL (C. A.). **Malaria in the Punjab. The Malaria Forecast for the Year 1922.**— *Indian Jl. Med. Res.* 1923. Oct. Vol. 11. No. 2. pp. 661–666. With 1 map. [1 ref.]

The malaria forecast for 1922 (cf. also this *Bulletin*, Vol. 20, p. 555) made upon the rainfall of July and August with a view to estimating the malaria incidence of October and November was completed on September 15, the day on which the last rainfall figures were actually received. It anticipated in reasonable detail a somewhat featureless malarial distribution, probably a more difficult matter to forecast with any accuracy than one possessing more definite characteristics.

C. L.

CHALAM (B. S.), with Explanatory Note by YOUNG (T. C. McCombie). **Some Notes on a Malaria Investigation on a Sugar Estate in Kamrup, Assam.**— *Indian Med. Gaz.* 1923. Oct. Vol. 58. No. 10. pp. 476–479. [2 refs.]

The results of a two years' investigation are here described. The employees on these sugar estates, lying on open grass-land edged by swamp and stream, suffer severely from malaria, the splenic index of resident children being 82. Of all anopheles captured as adults in the rainy season *A. vagus* comprised 50·5, *A. listoni* 44·3 and, among others represented, *A. culicifacies* 1·2 per cent. It is concluded that one of the first two must, on account of their numbers, be the essential vector of malaria here, and since of 412 specimens of *A. vagus* dissected none was found infected, while of 315 *A. listoni* 3·8 per cent. exhibited sporozoits in their salivary glands, the latter is inferred to be implicated. It was next determined that the adults of *A. listoni* were present in proportion as houses lay near to swamp or stream, the spots indeed where the larvae were in the main found. Even in the dry weather *A. listoni* comprised 46 of 54 imagines captured. Since larvicidal measures in these places seem unlikely to prove useful palliatives, it is advised that habitations be removed to a distance from these localities.

C. L.

STRICKLAND (C.). **Malaria in Assam**. [Correspondence.]— *Indian Med. Gaz.* 1924. Jan. Vol. 59. No. 1. p. 62.

Anopheles umbrosus has been found in the Balipara Frontier Tract, Assam, where the splenic index is 100. The Assamese fauna, particularly Anopheline, follows closely the fauna of Malaya, where this mosquito is markedly noxious.

C. L.

CORNER (Wm.). **[The Type of Malaria in Iraq.]** [Correspondence.]— *Trans. Roy. Soc. Trop. Med. & Hyg.* 1923. Mar. 15 and May 17. Vol. 17. Nos. 1 & 2. p. 89.

In Kirkuk, a submontane spot in Northern Iraq, the splenic index in February and March 1923 was 60·5 and the parasitic index,

presumably by simple smear, 47. Of the 213 malarial infections 150 were quartan, and the writer asks whether in any other district quartan malaria prevails to this extent.

[Sdrodowski and Lintdrop reported (this *Bulletin*, Vol. 19, p. 854) from Lenkoran, Azerbaijan, lying on the South-West Coast of the Caspian and within 350 miles of Kirkuk, local percentages of quartan malaria as high as 69·7 in July to September 1921. In December 1922 and January 1923 the percentage was only 43·2 (vide infra, p. 291). In Senegal high incidences have been recorded, that in Dakar being 42·6 per cent. (this *Bulletin*, Vol. 20, p. 292).]

C. L.

De Rook (H.). **Rapport omtrent malaria-onderzoek te Moeara-Tebo.** [Report on a Malaria Research at Moeara-Tebo (Djambi, Sumatra).]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1923. Vol. 63. No. 4. pp. 510–530. With 1 map.

This research became necessary to judge of the suitability of Moeara-Tebo as a military centre. Malaria (mostly tertian and subtertian) is endemic, but mild. *A. sinensis* was found to be the carrier; its natural infection index was 1·2 per cent.; no other species was found to be infected. The breeding places of *A. sinensis* in the vicinity of Moeara-Tebo were numerous (extensive swamps, drains, etc.), which makes sanitation very expensive and uneconomical. The author recommends quinine prophylaxis and suggests the use of buffaloes to attract the mosquitoes (Schüffner and Hylkema).

W. J. Bais.

Heydon (G. A. M.). **Malaria at Rabaul.**—*Health.* Melbourne. 1923. Nov. Vol. 1. No. 9. pp. 249–254. With 4 text figs.; and *Med. Jl. Australia.* 1923. Dec. 15. Year 10. Vol. 2. No. 24. pp. 625–633. With 5 text figs.

The latter is the fuller of two papers dealing with the same material but using different illustrations. Lying close to the equator with little seasonal or diurnal range of temperature, this volcanic island (New Britain) has a porous soil with, on the inadequately drained coastal flats, a high level of subsoil water at once exposed by shallow excavations. The prevalent anopheles is *A. punctulatus*, of varieties *moluccensis* and "D." The latter occurs in temporary puddles such as hoofmarks; the former in more permanent collections of water often close to the sea and containing 1 part of salt in 7, and is probably the common variety in Rabaul. Of laboratory reared specimens, variety *moluccensis*, 7 out of 15 became infected from a *P. vivax* case, and 7 out of 7 from one infected with *P. falciparum*. Of a successful infection with *P. malariae* Heydon questions the validity.

Dissection of mosquitoes caught in native houses showed sporocyst and oocyst rates of at least 6·4 and 6·2 respectively; the total infection rate is not indicated. In 1,145 natives under 18 years the splenic index was 20; in 489 similarly aged the parasite index was 30. The relative spleen rates for different communities are considered. Parasites resembling the younger stages of *P. tenue* have not been rare; full grown and sexual stages have been absent. They are considered variations of *P. falciparum*. In one film from the Duke of York Islands forms resembling *P. vivax minutum* (this *Bulletin*, Vol. 4, p. 88) were noted.

C. L.

Leslie (Percy C.). **Quartan Malaria.** [Case Report.]—*Canadian Med. Assoc. Jl.* 1923. Oct. Vol. 13. No. 10. pp. 752–753.

In Changteho (North Honan, China) quartan malaria appeared in the non-malarial season. Striking was the slightness of anaemia, and of splenic enlargement, fever and cachexia. Quinine gave early relief, but prolonged administration was necessary for cure, and parasites, whether sexual or asexual forms is unstated, might remain in the blood for many days.

C. L.

Padua (R. G.) **Findings on the Malaria Investigation within the Four Selected Zones in Laguna Province.**—*Monthly Bull. Philippine Health Service.* 1923. Feb. Vol. 3. No. 2. pp. 47–66.

The results of an intensive campaign carried out in the Philippines from mid-May to mid-August, mainly with a view to obtaining malarial indices, upon 2,267 persons, inhabiting 387 houses, are detailed in 24 Tables. The parasite index based on thick and thin films taken from the lobe of the ear, presumably a pair from each person, was 7·94. The percentages of *Plasmodium vivax, P. malariae, P. falciparum* and of the last 2 combined, were respectively 70·88, 19·23, 5·49 and 4·4; the splenic index was 62·15; the haemoglobin index had no relationship to the incidence of detected malarial infection; no reference is made to the possible effects of kala azar or ankylostomiasis on these two indices. It is recommended that every case of fever should be notified to and followed up by the nearest local health officer, individual daily observation and treatment being contemplated. No estimate of the degree to which the Health Department would then need expansion, nor of the expense involved, is added.

C. L.

Allen (A. H.). **Report of an Antimalarial Campaign conducted by the Medical Officers of the First Brigade, United States Marines, in Haiti.**—*U.S. Nav. Med. Bull.* 1923. Oct. Vol. 19. No. 4. pp. 402–407. With 1 chart in text.

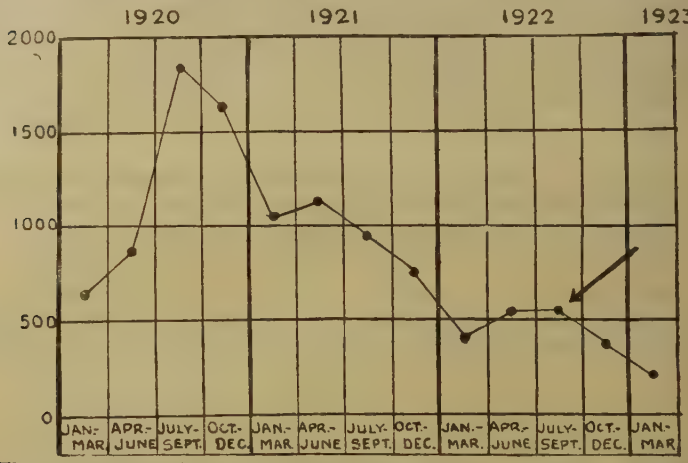
Storch (R. B.). **The Malaria Parasite in Haiti.**—*Ibid.* pp. 407–409. [3 refs.]

——**Personal Experiences with Malaria among Natives of the Republic of Haiti.**—*Ibid.* pp. 415–423.

The importance of malaria among marines in Haiti (this *Bulletin*, Vol. 20, pp. 563) is emphasized by the fact that in certain detachments the morbidity, presumably annual, was 400 per cent., and that the parasite index in apparently healthy natives was at least 50. In these circumstances attention is focussed on (1) the species of parasite concerned; (2) a quinine prophylactic campaign.

Acute and extraordinary doubt exists regarding the species of parasite implicated, but it is clearly not realized that, with infection so intense as it was, multiple infections must have been common and confusing. The clinical type appears to vary from frank tertian to haemoglobinuria. The quarterly incidence of malaria among marines is indicated in the accompanying chart, condensed from that of Allen, who claims that his results prove that it was possible to reduce malaria in marines in a highly malarious country by the administration

of quinine—in the way described by Bass (this *Bulletin*, Vol. 18, p. 97)—to Haitians living within a mile of the marines' camp. It is, however, clear that the main reduction in malaria was antecedent to, and of course independent of, the administration of quinine to the



The quarterly malaria rate of the First Brigade U.S.M.C., based on admissions per thousand per year (prepared from the author's chart, schematic). The arrow marks the point where the antimalarial campaign under consideration started, *i.e.*, September 1922.

neighbouring Haitians. Indeed, there is no convincing evidence offered that it had any hand in the continuation of the antecedent fall, brought about evidently by measures previously undertaken. Other points of interest are inability to determine the splenic index owing to the pot-bellied character of the population, the tolerance shown by the Haitians to the parasites, and their own conviction that mosquitoes and malaria are associated.

C. L.

De Freitas (Lafayette) & Barretto (Castro). **A Lucta contra a Malaria no Districto Federal do Rio de Janeiro e zonas limitrophes.**—47 pp. With 11 figs., 5 charts and 2 folding maps. 1922. Rio de Janeiro: Litho-Typographia Fluminense 21, 22 & 24 rua da Quitanda.

The mortality from malaria in the Federal District of Brazil has fallen from 328·75 per 10,000 in 1872–1876 to 19·18 in 1917–1921. Among 339 found infected at Merity the specific percentages were with benign tertian malaria 87·31, with malignant tertian 11·2 and with quartan 1·47. In another series the average percentage of infected was 45. The assumption by malaria of epidemic proportions in 1919 and 1920 coincided with excessive rainfall. River valleys and estuaries are the parts most severely affected, but man-made malaria in connexion with railways, brickfields, wells and irrigation is a definite factor. Of the mosquitoes identified, *Cellia tarsimaculata*, *C. argyritarsis*, *C. albimana*, are held to be implicated in the spread of malaria. Treatment of acute conditions is by injections, whether intravenous or not is unstated, of 0·5 to 1·5 gm. of bihydrochloride of

quinine, without ill effect. For the ordinary case 2 gm. is given daily for three consecutive days in three courses, two days separating the first and second course and three days the second and third. The preventive dose advised is 0·5 gm. daily or every other day. It is hoped to undertake the manufacture of quinine at the Oswaldo Cruz Institute. The extent of river rectification undertaken is nearly 300 miles, and much other reclamation work has been effected, striking photographs of which are given. The whole cost has been borne by the Brazilian Government.

C. L.

Brem (Walter V.). **Studies of Malaria in Panama. V. Pernicious Malaria.**—*Amer. Jl. Trop. Med.* 1923. Nov. Vol. 3. No. 6. pp. 517–527. [5 refs.]

Of 92 cases of malaria with pernicious symptoms 91 were infections with *Plasmodium falciparum* and 1 with *P. vivax*. The deaths numbered 41. The cases are divided into three overlapping classes of preponderating pathological phenomena: hyperinfection, cerebral thrombosis, and erythrolytic haemoglobinuria. Hyperinfection is held to occur if, when parasites are most numerous, that is to say, a few hours after the onset of the paroxysm, 6 per cent. of the erythrocytes be infected. Cerebral thrombosis is held established if there be stupor or coma with few parasites in the peripheral circulation; and erythrolytic haemoglobinuria by intense erythrocytolysis with no marked cerebral symptoms and few or no parasites demonstrable in the peripheral blood. There is, however, considerable overlapping, for of 22 cases of hyperinfection examined with that end in view 16 showed stupor or coma and 20 haemoglobinuria; so that the limit selected to indicate hyperinfection is probably that at which haemolysis becomes evident in the urine. Although he used 15 to 20 cc. of normal saline for his intravenous injections of quinine bihydrochloride, he believes that dilution should be to 100 cc. and 10 minutes occupied in the injection.

C. L.

Curry (Dalferes P.). **Some Remaining Problems of Malaria Control on the Isthmus.**—*Proc. Med. Assoc. Isthm. Canal Zone.* 1920. Jan.-Dec. Vol. 13. Pts. 1 & 2. pp. 57–65. With 1 plate.

This paper deals with the year 1920. Its main general interest lies in the indication that any relaxation of vigilance in the Canal Zone means increased malarial incidence. Colon was at that time being annoyed by swarms of Anopheles attributable to a swamp two miles away, half of this distance being covered by open water.

C. L.

Sergent (Edm.) & others. **Études sur le paludisme en Algérie 1922-23.**—*Arch. Inst. Pasteur d'Algérie.* 1923. Sept. Vol. 1. No. 3. pp. 261–583. With various plates & figs. [Refs.]

Note XXV. **De l'immunité-tolérance obtenue dans le paludisme des oiseaux par inoculation de sporozoites vivants.** Sergent (Et. & Edm.) & Catanei.] pp. 264–269. With 1 chart. [3 refs.]

It is found that it takes the bodies of 3 mosquitoes "normally" infected with *Plasmodium relictum* of sparrows (sporozoits, whether

contained in the salivary glands or dispersed over the body generally [this *Bulletin*, Vol. 18, p. 103] being injected) to produce severe infection in canaries. When the dose was reduced to two-thirds or three-quarters of the body of a single such mosquito severe illness followed in 5 cases, slight illness with subsequent immunity in 13, neither immunity nor illness in 7.

NOTE XXVI. **Suite des essais de traitement préventif ou curatif du paludisme par des produits autres que la quinine : Cinchonidine.** [SERGENT (Et. & Edm.) & CATANEI.] pp. 270-275. [1 ref.]

In canaries cinchonidine bihydrochloride appears somewhat less toxic than the similar salt of quinine. It has, however, no action on *Plasmodium relictum*, either preventive or curative, except in toxic doses, but it has a marked influence in reducing splenomegaly; and its action in this respect in man is worth consideration.

NOTE XXVII. **Peut-on déterminer la dose infectante minimum de sang parasité ?** [SERGENT (Et. & Edm.).] pp. 276-278.

By determining the number of erythrocytes per cmm., the percentage of these found under the microscope to be infected, and the quantity of blood intraperitoneally injected, the number of *Plasmodium relictum* received by experimental canaries was calculated. In the instances cited it varied from 1,000 to 10,000, but the intensity of infection produced in the experimental birds had no relation to the number of parasites injected. In all cases the blood was drawn at the same stage in the life-history. The finding points, of course, to some degree of natural immunity.

SECTIONS VI to XXI, pp. 291–583.

Of Saharan anopheles the predominant species is *A. multicolor*, developing from egg to adult in 13 days in water often salter than the sea. Although never definitely implicated as a host of the human plasmodia its almost invariable presence in malarial oases indicates this to be the case. *A. sergentii*, *A. hispaniola* and *A. maculipennis* are also sparsely found.

Of 4,531 persons examined, mostly in the non-epidemic spring, the splenic index was 35·7, and the parasitic 10·7, the latter consisting of *P. falciparum* 2·1, *P. vivax* 4·6, *P. malariae* 1·8, and undetermined forms 2·1. The splenic index varies in different spots from 0 to 100, and, for the whole series, had the following age differences: up to 1 year, 13·7; from 1 to 5 years, 32·8; from 6 to 15 years, 39·8; over 15 years, 10·4. Regarding the amount of enlargement, this is measured in finger-breadths, without allowance for stature, so that it is naturally least in infants and greatest between 6 and 15. The parasite index also varied with locality, from 0 to 65, taken in the spring and based on a thin and a thick preparation. Comparing parasite and spleen rates, one child in three had a palpable spleen, and one in ten parasites detected, by the technique indicated, in the peripheral blood.

Breeding places are natural and artificial, temporary and permanent. Those in proximity to European dwellings are nearly all man-made. For quinine prophylaxis daily doses of from 5 to 40 cgm. ($\frac{3}{4}$ to 6 grs.) are advised, according to age, swallowed in the presence of a trust-worthy official. Of antilarval measures there are stressed the necessity

that housing-sites shall in future be selected only after adequate investigation of their proximity to anopheline breeding places, and that facilities for irrigation shall be granted only under guarantees that such spots shall not be produced. The local conditions prevailing in Southern Algeria and in various cantonments are fully considered. Photographs from aeroplanes illustrate local topography and the extent to which antilarval operations have been undertaken. As a record on which future work will be built the study is invaluable. The malarial problem in Morocco is briefly considered.

C. L.

Sdrodowski (P.) & Lindtrop (H.). **Weitere Beobachtungen ueber Malaria in Aserbeidshan.** [Malaria in Azerbaijan. Further Observations.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1923. Nov. Vol. 27. No. 11. pp. 401-404.

These writers report further observations in December 1922 and January 1923 (this *Bulletin*, Vol. 19, p. 854).* The parasite index, based on one thick preparation, was 53·9, many of the infected having no symptoms. The splenic index was 76·8, and Ross's index 4·7. The percentages of malaria species present were *P. vivax* 18·1, *P. malariae* 43·2, *P. falciparum* 28·7, undetermined 10. The endemic index may reach 100.

C. L.

i. Mackenzie (Melville D.). **Notes on the Epidemiology of Malaria in South-East Russia.**—*Lancet.* 1923. Dec. 8. pp. 1225-1227. With 3 charts.

ii. Christie (Ethel M.). **Malaria Clinics in Russia.** [Correspondence.]—*Ibid.* 1924. Jan. 26. pp. 204-205. [1 ref.]

i. The Senior Medical Officer, Friends' Russian Famine Relief Unit, S.E. Russia, reports that in 1921 half the inhabitants of Buzuluk Ooyezd, a district the size of Wales, died of starvation and typhus; thousands fled two thousand miles to Turkestan, where wheat was available. They returned after the harvest of 1922, bringing with them malaria, which in October of that year broke out in pandemic form all over south-east Russia, and steadily spread throughout the winter, with the thermometer standing at 20° to 30° below zero Centigrade, since Anopheles had become domesticated, breeding in the waterbutts within the huts, which were maintained, as is usual, at almost tropical temperatures. The terrifying effect of this new disease on the already debilitated population was such that they were prepared to accept any reasonable terms to escape it. This fear was used for their benefit.

The difficult factors involved were: an immense area; a famine which had destroyed almost all horses and half the population, and left the rest so weak that they could neither plough, collect food, look after their few animals, carry the rations issued by the Relief Unit, nor be reached by the few surviving doctors. Seeing that their bread was still diluted with grass their condition is scarcely to be wondered at. In wide distribution of quinine lay the only hope; but

* By a slip Lenkoram was there referred to as on the Western Caucasian shore. Azerbaijan Republic is on the Western Caspian shore, adjoining the Persian province of the same name.—C. L.

that available for private use was too little for adequate dosage, it was being frittered away by administration to non-malarious patients, and from hospitals it was being surreptitiously sold by attendants at a million roubles for five grains. The difficulties were overcome at the established clinics by not giving quinine unless malaria were microscopically established, by not accepting a case as negative unless no parasites were found after three examinations (each presumably by a single thin smear) during fever, and by making every case attend at a clinic and swallow every dose there. Administration was by one dose daily of 20 gr. of the bisulphate for a week, and thereafter 15 gr. on 2 days a week for 2 months. No course of treatment was begun without a promise that it would be completed, and so great was the dread engendered by this strange and devastating epidemic, combined with the knowledge that quinine would not be forthcoming in a future attack were this promise broken, that a long treatment was practically always administered. At the clinic in Buluzuk, town-educated Russians were trained for 3 months and then sent into the district, each in charge of a clinic of his own, run exactly on the lines indicated.

The percentage of positive blood examinations rose steadily from 50 in November, 1922, to 80 in May, 1923, but while the proportions of benign tertian, subtertian and quartan were at first 48, 36 and 16, at the end benign tertian comprised 98 per cent. of the whole. The writer adds :—

"The effect of the epidemic on the future of Russia will probably prove to be greater than that of the Revolution. From a healthy country inhabited by a virile energetic peasant population and entirely non-malarial throughout its greater extent the whole of South Russia is now probably the most malarial country in the world." "It is probable that a great degeneration comparable with the effect of malaria on ancient Greece will in the next 20 years alter the type of the whole population of these Cossack districts and will threaten to overwhelm the rest of Russia."

The fascination of this picture lies in the heightened incidence of malaria at an out-door temperature of – 30° C., and in the far-reaching effects, hygienic, political and economic, which its pandemic incidence must have on the Russian nation ; consequences beyond the horizon of those who initiated the upheaval to which they are directly traceable.

ii. Dr. Christie refers to the Buzuluk clinic with 200 new patients a day, arriving behind horses, cows or camels from 50 miles round, their equipages blocking the street for 100 yards ; and yet there are those who have to be turned away. Gifts of money or quinine may be sent to the Friends' Council of International Service, 136, Bishopsgate, London, E.C. 2. Clearly the medical administration insures that every grain shall go its furthest.

C. L.

FABER (L. A.). **Bewerking van de gegevens der malaria-epidemie te Sloten in 1922.** [Details of the Malaria Epidemic at Sloten.]—*Nederl. Tijdschr. v. Geneesk.* 1923. July 7. 67th Year. 2nd Half. No. 1. pp. 9-20. With 1 fig. [8 refs.]

In 1921 there were under the author's care at Sloten, near Amsterdam, 203 cases of benign tertian malaria, or 5 per cent. of the population ; in 1922, 362 cases, or 9 per cent. In 1922, the monthly

incidence was: 0(0)–2(1)–14(8)–38(27)–87(66)–595(82)–62(56)–31(28)–21(17)–10(9)–2(2)–0(0), the figures in brackets indicating the number of cases considered as primary. Apart from a relative infantile immunity, all ages were equally affected. All diagnoses rested on thick and thin films. In 28 persons who had suffered from malaria in the previous year, but had not taken quinine for at least 3 months, and were examined in April, 12 showed plasmodia in the peripheral circulation, and 5 relapsed; in 16 the blood examination proved negative and 7 relapsed.

In one case of parasitic without clinical relapse, schizonts numbered 35 per 15 leucocytes, and two days later gametocytes were also found. In children of 8 to 14, taking daily 0·75 gm. (12 grs.) of quinine sulphate, parasites (in one case schizonts are specified) disappeared from thin films in 1 to 2 days; from thick preparations in 6 to 7 days. No correlation was detected between the duration of the illness and the finding of gametocytes. They were present after the second as frequently as after several attacks or as in relapses.

Splenic enlargement, particularly affecting children, occurred in 9 of 30 cases after one attack, in 55 of 112 after two attacks, and in 32 of 41 after three or more attacks. It quickly disappeared under quinine.

More than half of the cases relapsed after treatment equally whether long continued with large doses, 2 grams a day for three weeks as Thomson advocated, or for shorter periods with ordinary doses. The author suggests that quinine in solution might prove more beneficial than in the tablet form.

N. H. Swellengrebel.

Senevet (G.). **Le paludisme dans la Double (Dordogne).**—*Arch. Inst. Pasteur d'Algérie.* 1923. Dec. Vol. 1. No. 4. pp. 604–606.

The shrinkage of malaria in the Double has coincided with a lessening of anopheles breeding-places, due to an extensive, though not complete, draining of marsh land; to extended use of quinine; and, above all, to a raised standard of living, as witness the fact that the wife is no longer yolked with the family ass to help drag a primitive plough.

C. L.

Maxcy (K. F.) & Coogle (C. P.). **The Spleen Rate of School Boys in the Mississippi Delta.**—*Public Health Rep.* 1923. Oct. 26. Vol. 38. No. 43. pp. 2466–2472. [7 refs.]

Malarial investigations in the Mississippi Valley (this *Bulletin*, Vol. 20, p. 963) have now been extended to the delta. Schoolboys were examined in the winter; the spleen was deemed enlarged only if palpable beyond dispute; the parasite index was based on a thin and a thick preparation. It is urged as acceptable that a spleen rate of over 1 per cent. is indicative of malaria, that infection is markedly focal and that such a focus should be investigated if the rate, over a considerable number of investigations, exceed three or four.

Of 531 examined, 135 were positive either to blood or spleen examination, the blood detecting 40 and the spleen 108; so that the splenic index was higher than, and hygienically as valuable as, the blood. The splenic index was higher in coloured than in white boys.

C. L.

Boyd (Mark F.). **A Report to the Missouri State Board of Health on the Incidence of Malaria in South-East Missouri.**—*Rockefeller Foundation, International Health Board.* Publication No. 7603. 47 pp. With 1 graph. 1922. May. New York City.

When investigation of this problem was undertaken, a representative strip of land 24 miles long from East to West by 12 wide from North to South was chosen, of which Boyd, of the International Health Board, investigated the northern half, and Ziegler, of the U.S. Public Health Service, the southern. The latter's work has been considered in this *Bulletin* (Vol. 20, p. 963). Boyd's, undertaken at the same time, forms a valuable independent confirmation of the results already abstracted.

C. L.

Gill (C. A.). **The Relation of Malaria to Altitude.**—*Indian Jl. Med. Res.* 1923. Oct. Vol. 11. No. 2. pp. 511-542. With 2 charts. [20 refs.]

Gill considers the relation between his own observations on the correlation between malaria and humidity (this *Bulletin*, Vol. 17, 293–4; 18, p. 328), and the generally accepted observation that there is no danger of acquiring malaria in the Himalayas at altitudes of over 7,000 ft. He shows that at Murree, at an altitude of 7,500 ft., the malaria carriers *Anopheles willmori* James and *A. plumbeus* Haliday are common from May to August; that heavy gametocyte-carriers of *Plasmodium vivax* are readily to be obtained in the station; that there exists for about 8 weeks of the year, round about August, that combination of a mean temperature of at least 61° F., with a humidity of at least 63 per cent., whose combined continuance for at least 14 days he has shown in India and England to be essential for the appearance of malaria; that *A. willmori*, kept at temperatures between 20° and 22·2° C. (68° and 72° F.), will develop oocysts and sporozoits, the latter in 14 days or more; and that infection is then actually conveyed by its bite. His conclusion that malaria can naturally be acquired in Murree must, however, be contingent upon whether the daily natural range of temperature there remains within these narrow limits. If the diurnal range be greater, as one's experience in other Indian hill stations suggests is the case, conclusions as to natural anopheline development of benign tertian parasites would hardly hold.

Gill's tentative suggestions regarding the causation of malarial relapse are opportune and illuminating. He quotes the work of Acton and his collaborators (this *Bulletin*, Vol. 18, p. 335) indicative of a selective action by quinine on the schizonts of *P. falciparum* which allows *P. vivax* to survive and to relapse, points out that in Muscat he found relapses to be due almost entirely to *P. falciparum*, and suggests that environmental conditions associated with high altitude may be particularly conducive of relapse in benign tertian malaria. In other words, his warning must imply that the quinine theory (*l.c.* Vol. 19, p. 277), explanatory of the seasonal variations of the different parasites of malaria, does not cover the whole matter, and that there really are climatic influences which determine the survivals and recrudescences of malarial parasites while they inhabit man. The filling of the gaps in our knowledge on this matter would be of the greatest value.

C. L.

Das (Sundari Mohan). **Malaria and Abortion.**—*Calcutta Med. Jl.* 1923. Aug. Vol. 18. No. 2. pp. 348-352.

It is estimated that by abortion the potential population of Bengal is lessened by 800,000 annually, and it is judged, by experience of 185 cases, that 37-8 per cent. of these abortions are caused by malaria. Eleven illustrative cases are given in none of which is there any mention of blood examination. The author considers that quinine intramuscularly is wonderfully tolerated, and he has never met a case in which it acted as an "oxytocic." The other chief conditions to which abortion is attributed are syphilis, endometritis and early conception, and the criminal indifference of husbands to the results of their premature marital relations is the subject of severe comment. Dr. Stopes' aid has not apparently been sought. The possible abortifaciet effects of hook-worms, indicated by Stiles in 1911, are unnoted in spite of the heavy incidence of that infection which plagues Bengal.

C. L.

di Pace (Ignazio). **A proposito dell' urobilinuria nella diagnosi della malaria latent.**—*Policlinico.* Sez. Prat. 1923. July 9. Vol. 30. No. 28. pp. 893-897. [8 refs.]

Being sceptical as to expressed opinion that urobilin in the urine is a satisfactory indication of malaria, di Pace has investigated the matter in 181 cases. Its presence was constant when parasites were found in the blood and clinical evidences of malaria were present, frequent where there had been an acute attack within two or three months and parasites were still detectable in the peripheral blood, rare where the last attack was more than four months previous and where parasites were only found if they had been driven into the peripheral blood by an injection of strychnine, exceptional in asymptomatic latent malaria. It is not then likely to help a diagnosis in those cases where help is required. Some of the reactions were very slight and the test requires, as far as possible, exclusion of light and air.

C. L.

McAlister (W.). **The Treatment of General Paralysis by Infection with Malaria.** *Brit. Med. Jl.* 1923. Oct. 20. pp. 696-698.

Grant (A. R.). **The Treatment of General Paralysis by Malaria.** *Ibid.* pp. 698-700. [9 refs.]

Cases of deliberately inoculated malaria are now reported from Britain. McAlister obtained his infection from one who had acquired benign tertian malaria in Burma, and at the height of a paroxysm enough blood was taken to inject at once 2 cc. subcutaneously into each of 12 paralytics. All became infected, after incubation periods varying from 8 to 32 days, diagnosis being by the microscope. Quinine hydrochloride, 10 grains every four hours for three days, and thereafter 5 gr. three times a day for 14 days, were given after about twelve paroxysms had shown themselves, and 0·3 gm. of novarsenobenzol weekly for six weeks. No clinical relapses occurred.

Grant injected subcutaneously into 40 patients 2 cc. of blood from one of four sources, a quartan, a subtertian and two benign tertian. One of the last sources, obtained originally from and first injected

by STEPHENS, was the only one persisted in. It had been brought from Liverpool to Whittingham in a thermos flask, two and a-half hours elapsing between its being drawn and re-injected. Thereafter infection was continued by subcutaneous injection of 2 cc. of blood from patient to patient drawn indifferently during or between paroxysms. This strain has passed through 15 hosts and seems to be increasing in virulence since temperatures rule higher than they did a year ago. One case has spontaneously recovered from his malaria. The others have been treated with quinine sulphate, in all cases without clinical relapse, 2 gm. daily for 3 days proving as effective as a total of 48 gm. This curious lack of relapse, so prominent a feature of these inoculated benign tertian infections, is attributed either to some condition present in paralytics, or to failure of passage through the mosquito, though the latter, one would imagine, could hardly have such an immediate effect.

C. L.

WORSTER-DROUGHT (Cecil) & BECCLE (H. C.). **The Treatment of General Paralysis of the Insane by Malarial Infection. (Preliminary Note.)**—*Brit. Med. Jl.* Dec. 29. pp. 1256–1257. [8 refs.]

The strain of benign tertian malaria used was obtained by Low's courtesy from the Seamen's Hospital, Endsleigh Gardens, London. Infection was carried on by the subcutaneous injection of 2 cc. of blood, drawn at any period, febrile or afebrile. After 12 attacks the infection was treated by one or two intramuscular injections of 15 grains of quinine bihydrochloride, followed by seven days' oral administration of 5 grains of quinine sulphate daily. No clinical relapses have occurred.

C. L.

PLEHN. **Die Malariabehandlung der progressiven Paralyse.**—*Deut. Med. Woch.* 1924. Feb. 1. Vol. 50. No. 5. pp. 136–138. [15 refs.]

For the 41 paralytics here reported as deliberately infected with malaria three sources were used: (1) a subtertian infection which resulted in one direct death from cerebral malaria; (2) a frank tertian infection from Hungary; (3) a strain from Palestine with quotidian fever and no gametocytes, upon whose specific position the writer does not commit himself. Treatment was by intramuscular injection of bihydrochloride of quinine, 1 gm. on 2 consecutive days; on the third day after, 0·5 gm.; the same quantity being repeated two or three times at intervals of four days. No clinical relapses occurred, and among the seven who died the only instance in which search revealed any parasite in any organ was that above mentioned in which death followed coma. The dose of quinine which apparently produced complete disinfestation for both tertian and subtertian malaria was accordingly in this series 7½ to 10 gm. of the bihydrochloride.

C. L.

Ross (Ronald). **Notes on the Inoculation of Malaria.** [Correspondence.]—*Brit. Med. Jl.* 1924. Jan. 19. p. 130. [4 refs.]

In view of the number of malaria inoculations now being made in the treatment of general paralysis, Ross urges investigation on the following points: (1) Is it the case in human malaria, as Ben-Harel (this *Bulletin*, Vol. 21, p. 138) has shown for bird malaria, that the erythrocytes begin to fall in numbers within 24 hours after infection and long before parasites are detectable in the circulating blood? ; (2) Could not more exact figures regarding the number of asexual parasites injected be given, so that the factor of individual resistance may be determined? ; (3) Is there really absence of parasitic relapse in these inoculation cases, as the records imply?

C. L.

Herzig (Ernst). **Zur Malariabehandlung der P.p.**—*Wien. Klin. Woch.* 1924. Jan. 24. Vol. 37. No. 4. pp. 88–89.

The kind of malaria used in these cases seems nowhere stated. In one case a temperature of 43° C. (109·4° F.) was induced, fortunately without harm.

C. L.

Silvestri (Silvestro). **Assorbimento, eliminazione, tossicità della cinconina.** [The Absorption, Excretion and Toxicity of Cinchonine.]—*Policlinico.* Sez. Med. 1923. Dec. 1. Vol. 30. No. 12. pp. 601–610. [9 refs.]

Rabbits were intragluteally injected with 200 mgm. of alkaloidal bihydrochloride, three with quinine and three with cinchonine; one from each series was killed after 12, 24 and 72 hours; and the number of mgm. of salt recovered (*a*) from the site of injection, (*b*) from the viscera, was determined in each instance. They were as follows:—

Hours after injection.	Recovered from site of injection.		Recovered from viscera.	
	Quinine.	Cinchonine.	Quinine.	Cinchonine.
12	80	40	30	88
24	65	30	26	65
72	28	10	8	2

Clearly cinchonine entered the circulation more rapidly than did quinine; moreover, it gave rise to no local necrosis. Further, with oral administration Tanret's reaction gave in the first 24 hours a much more marked urinary turbidity with cinchonine than with quinine; so that administered by either route cinchonine is more rapidly absorbed than quinine. It has also been tolerated where quinine has apparently produced toxicity (this *Bulletin*, Vol. 21, p. 93).

C. L.

MANOUKHIN (Ivan I.). **The "Self-Defensive Reaction" in the Treatment of Malaria.**—*Lancet.* 1924. Jan. 26. pp. 170–174. With 4 figs. [53 refs.]

On grounds far from fully covered by this paper Manoukhin concludes that all infections, malaria among them, are accompanied by a primary and a secondary hypoleucocytosis divided by a hyperleucocytosis, the last being ended by means of a leucocytolysis, the phenomenon which he designates as a "self defensive reaction." Malaria he treats by X-radiation of the spleen, filtered through 1 mm. of aluminium, in a dose equal to 1 h. (Holzknecht unit), of duration five minutes daily, at 1 milliampère, of hardness 8, at 25 cm. from the surface of the body. The liver must be entirely shielded since its action is held antagonistic to that of the spleen, the action of the rays on the latter activating its leucocytolytic action. The good effects do not usually appear for 8 or 10 days. He has had no deaths and no relapses, comments on the good condition of his patients, and considers that the disease is by this treatment shortened to one-third. He contrasts his results with those of a neighbouring hospital giving quinine, to the marked detriment of the latter; but he has not dealt with the consideration that "quinine" which usually takes thrice eight days to cut short malaria is not really quinine.

C. L.

DE FREITAS (Q. B.). **Quinine per Rectum in the Child.** [Correspondence.]—*Jl. Trop. Med. & Hyg.* 1923. Nov. 15. Vol. 26. No. 22. p. 348.

A 20 years' use of quinine rectally in British Guiana convinces de Freitas that but for this method promptly used many infants there would die of malaria. He has never seen any of the sequelae mentioned by FLETCHER (this *Bulletin*, Vol. 20, p. 970), and agrees with each of NEWHAM's statements (*loc. cit.*). He uses the ordinary acid solution of sulphate of quinine, 10 grains in an ounce with 20 grains of bromide of potassium, and gives an infant 6 to 8 drachms.

C. L.

KLIGLER (I. J.) & WEITZMANN (I.). **Malaria Control Demonstrations in Palestine. Report on Malaria Control Demonstrations of the Hadassah Medical Organisation.**—75 pp. With 6 figs., 1 map and 2 charts. 1922. Jerusalem: Printed by the Jerusalem Printing Works, Ltd.

Features of more general interest are the extent to which, in the areas investigated on the shores of the Sea of Galilee, malaria was man-made by careless irrigation and insufficient treatment. A curious natural feature is that described as a "gravel swamp," a layer of exposed gravel, lying evidently on some impermeable stratum, over which water trickles. The layer of gravel is deep enough for the upper stones to overlie the water, but beneath them Anopheles breeds freely. The condition seems unlikely to be bettered without considerable engineering. The anti-larval measure found most useful was a mixture of one part of crude oil and four of petroleum, which gave a uniform tenacious film five times the area of a 1 in 9 mixture. If 0·1 per cent. of castor oil were also added the area of the film was further doubled. A 1 per cent. cresol mixture in water was more effective in the gravel swamp than was oil-paraffin, but cresol, if

added elsewhere to the latter appeared to prolong the film's existence. It is concluded that in Palestine a large measure of malarial control can be obtained at a cost of less than P.T. 50 for the first year.

Old terms are employed with new and unemphasized meanings. The word "carrier" is used in one place of any one with a recent history of malaria, or with a soft and enlarged spleen, or again with parasites detected presumably in a thin smear of peripheral blood. Elsewhere, for "recent malaria" as a sufficient designation for a carrier is substituted "chronic malaria." In a third spot it is stated that 25 per cent. of the Jewish and 50 of the Arab population suffered from chronic malaria and that 4 per cent. or more are active parasite carriers, where the term is presumably used in the accepted sense.

This supplement to the Report for the year 1920–21 has only just been made available, and it seems likely that the very evident lack of proof reading, responsible for these inconsistencies and for a number of detected and undetected printer's errors, may be no fault of the writers. Finally, it is necessary to note that they attribute to the Sectional Editor certain conclusions and suggestions which WENYON'S ripe experience originated, and that they have clearly found the pages of this *Bulletin* to be of marked value.

C. L.

KLIGLER (I. J.). **Quinine Prophylaxis and Latent Malaria Infection.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1923. Oct. 18. Vol. 17. No. 4. pp. 259–262.

In Athlit in July, 1922, 80 men lost 315 days' work from malaria. Regular quinine administration of 2 gm. (30 gr.) daily for five days, and thereafter 10 gr. daily until November, produced the result that in that month 200 men lost 125 days' work from that infection. In December quinine administration was stopped, and of 112 men examined four days later parasites were found in just over a quarter. Quinine had kept these men at work, but had masked infections so that 30 of them on stopping quinine would have become foci of infection.

Similarly, to 12 children at Ein Harod a conscientious nurse administered quinine daily during the malarial season, and only two suffered from malaria. On stopping quinine 11 of the 12 fell ill with malaria within three weeks, parasites being, however, most difficult to detect. There was no corresponding illness among adults. It is held that the commercial possibilities of this induced latency are overweighed by its hygienic potentialities for ill.

C. L.

RICCI (Omero). **Relazione medica sulla Campagna antimalarica nella "Zona della Valle dell' Inferno."**—*Policlinico.* Sez. Prat. 1924. Jan. 28. Vol. 31. No. 4. pp. 122–123.

The Vale of Hell in 1923 housed 1,189 souls, 937 being permanent denizens, 252 making but a temporary sojourn. Three-quarters of them were racked by malaria—judging by blood examination of 16—and 30 per cent. experienced malarial relapse. They consumed, in the period, over 15 kgm. of quinine. It is urged that it needs but persistence in the good works of hygiene to uplift, as its neighbours have been raised, this mephitic suburb of Rome, studded as it is with water pools made by man and nature.

C. L.

Fontoynont. **Prophylaxis biologique du paludisme et des infections intestinales.**—*Congrès de la Santé Publique et de la Prévoyance Sociale, Marseille, 11–17 Septembre, 1922. Comptes Rendus.* pp. 353–354.

The biological prophylaxis of malaria, through war against anopheles larvae by fish, is not here under consideration. It is noted that two spiders *Nephile madagascariensis* and *Epeira-levista* [sic] have been deemed to be of value against imagines. The former, for instance, was required in 1904 for experiments for weaving its web into silk, and 300,000 of them were destroyed in three months. It is judged that at a conservative estimate these would have destroyed 3,000,000 mosquitoes, and a coincident rise in malaria is attributed to the latter's survival. Another spider is held to be specially destructive of *Lucilia caesar*, and so to be inhibitive of dysentery, while the first has been imported into the Congo in the hope that it will decimate the tsetse fly.

C. L.

MacGregor (Malcolm E.). **The Development of Modern Anti-Malaria Campaigns.**—*Lancet.* 1924. Jan. 5. pp. 24–25.

At the end of a definitely worded paper the writer's views are thus expressed :—

"Since it may be said that the foundation of economic and modern anti-malaria campaigns lies in the adoption of direct and permanent measures against only the proved breeding places of the definitely incriminated vectors, and the avoidance of all measures that are merely palliative or which aim at dealing in any locality with the anophelinae in general, it follows that the command of such campaigns must, in future, rest with the chief entomologist and his staff."

C. L.

Rand (R. F.) ; Stannus (H. S.). **Prophylaxis of Malaria and Black-water Fever.** [Correspondence.]—*Brit. Med. Jl.* 1924. Jan. 12. pp. 85–86 ; Jan. 26. p. 172.

Is the prophylactic value of quinine the result of distaste on the mosquito's part for bitter blood ? If so, why not substitute the the cheaper aloes ? The path for black water fever is laid by malaria, it occurs in those who may fitly be described as malarial cachectics, and the liability to it can be lessened by the regular use of gelatin, by iron and arsenic, by the antiscorbutics—milk, citrous fruits, fresh meat and fresh vegetable, especially the bamia and egg fruit, and by avoidance of extremes of weather, fatigue and worry.

Stannus points to the absence of scientific proof of the statements made above, some indeed being incorrect.

C. L.

Chambers (J. H.). **The Complement Fixation Test and other Findings in Malaria.**—*U.S. Nav. Med. Bull.* 1923. Nov. Vol. 19. No. 5. pp. 661–667. [15 refs.] and *Amer. Jl. Trop. Med.* 1923. Nov. Vol. 3. No. 6. pp. 509–516. [15 refs.]

The conclusion reached, based on work done in connexion with the artificial production of benign tertian malaria, is that active malaria may on rare occasions produce partial inhibition of haemolysis in

serum obtained during active schizogony, and accordingly that no attempt should be made to diagnose syphilis by complement-fixation so long as malaria parasites are recognisable in the cutaneous blood.

C. L.

Goodman (Neville M.). **A Case of Malaria arising in this Country.**—*Brit. Med. Jl.* 1923. Dec. 22. p. 1205. [4 refs.]

In 1923, ten days after leaving a Girl Guides' camp at Pitsea, Essex, a girl of 12 developed benign tertian malaria. A farmer at the nearest habitation, half-a-mile from the camp, had acquired malaria locally 30 years ago, at which time, he said, every one on the marsh land had ague; examination of his blood revealed no parasites. The girl's father, whose blood was not examined, living in the East End of London, had had "sandfly fever" in Gaza in 1917, and a similar attack in France in 1918. It is concluded that there is an endemic malarial focus at Pitsea.

C. L.

Marinesco (G.) & Draganescu (State). **L'influence nocive du néo-salvarsan sur les sujets atteints de syphilis et de malaria. (Contribution à l'étude des lésions histologiques des centres nerveux dans la malaria comateuse.)**—*Bull. Acad. Med.* 1923. Dec. 18. Year 87. Vol. 90. 3rd Ser. No. 43. pp. 598–602. [6 refs.]

Neosalvarsan given to a general paralytic lighted up a fatal subtertian malaria. The brain, besides the usual haemorrhages, contained microscopic nodular spherical lesions. Surrounding an obstructed capillary with homogenous walls lay, in order, a layer of necrotic tissue, a zone of neuroglial elements, and a circlet of extravasated blood.

C. L.

i. Armstrong (John S.). **Notes on a Case of Ascariasis simulating Malarial Fever.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1923. Mar. 15 & May 17. Vol. 17. Nos. 1 & 2. pp. 49–50 With 1 chart.

ii. Fontoynont. **Les lesions vasculaires dans le paludisme.**—*Congrès de la Santé Publique et de la Prévoyance Sociale, Marseille, 11–17 Septembre, 1922. Comptes Rendus.* pp. 221–224.

Roussy. **Classification des psychoses paludéennes.**—*Ibid.* pp. 224–228. [17 refs.]

iii. Hoffmann (W. H.). **La infiltración calcerea vascular de Duerck en la encefalitis látargica y la malaria tropica.**—*San. y Benefic. Bol. Ofic.* 1922. Vol. 27. Nos. 9, 10, 11 & 12. pp. 486–488.

iv. Guimarães (Aristides Galvão). **Formula de Armstrong no paludismo.**—*Bol. Soc. Med. e Cirurg. de S. Paulo.* Brazil. 1922. Dec. & 1923. Jan.-Feb. Vol. 5. 3rd Ser. Nos. 10, 11 & 12. pp. 206–208.

v. Gordon (R. M.). **The Urine in Malaria.** [Miscellanea.]—*Ann. Trop. Med. & Parasit.* 1923. Dec. 21. Vol. 17. No. 4. p. 556.

vi. Levy (Moise D.). **Malarial Nephritis.**—*Southern Med. Jl.* 1923. Dec. Vol. 16. No. 12. pp. 942–944. [3 refs.]

vii. Sabrazès. **Quelques syndromes et séquelles du système nerveux central dans le paludisme.**—*Gaz. hebd. des Sciences Méd.* 1923. Oct. 21 & 28. Vol. 44. Nos. 42 & 43. pp. 526–540.

viii. Etienne (G.) & Benech (J.). **Diabète grave au cours du paludisme prolongé.**—*Bull. et Mem. Soc. Méd. Hôpit. de Paris.* 1924. Jan. 24. Year 40. 3rd Ser. Vol. 48. No. 2. pp. 59–61.

i. Short high paroxysms of a double quartan type disappeared after the passage of 4 female ascarids. Ova, whether fertile or unfertile is not stated, were detected in the faeces together with trichuris ova.

ii. In neither paper is any evidence offered that the disabilities described were caused by, and were not mere concomitants of, malaria.

iii. Hoffmann draws attention to Duerck's findings in encephalitis lethargica and subtertian malaria (this *Bulletin*, Vol. 17, p. 298) in which, it now appears, dark ground illumination shows that calcareous deposits rapidly appear in the outer and middle coats of small vessels of the basal ganglia, medulla and cerebellum, spreading to the intima and causing vascular constriction and occlusion.

iv. In a woman in whom no parasites were found but who was clinically malaria and who reacted rapidly to quinine the mononuclears, larger than a polynuclear leucocyte, gave percentages in three slides of 20, 22, and 18, the first before quinine was given, the others after.

v. Of 16 cases of malaria 10 showed albumin, casts, or renal epithelium, 1 out of 1 being infection with *Plasmodium malariae*, 2 out of 2 with *P. vivax*, and 7 out of 13 with *P. falciparum*.

vi. Three cases are cited of subtertian malaria with albuminuria, casts and anasarca. In no case did the condition completely clear up, although marked improvement set in with treatment; and in no case is evidence offered as to the antecedent urinary condition.

vii. There appears to be nothing in these cases not familiar to practitioners in the tropics.

viii. A man acquired malaria in Salonica in 1917. Parasites were still present in 1919, but no later note of their detection is to be found. In 1922 he had a sharp disturbance of unstated character, and seven days later evidences of diabetes first showed themselves. No evidence of its association with the presence of parasites or of its amelioration under antimalarial treatment is offered.

C. L.

i. Autric. **Réactions des paludéens sous l'influence de la quinine.**—*Congrès de la Santé Publique et de la Prévoyance Sociale, Marseille, 11–17 Septembre, 1922. Comptes Rendus.* pp. 214–220.

ii. Dixson (T. Storie). **The Treatment of Chronic Malaria.**—*Brit. Med. Jl.* 1923. June 30. pp. 1087–1088. With 1 fig. [4 refs,]

iii. Brandão (Aureliano). **O 914 e a malaria.**—*Brazil-Medico.* 1923. Oct. 20. Year 37. Vol. 2. No. 16. p. 243.

iv. Morris (Leslie M.). **Naval Medical History of the War, Section of Tropical and Sub-Tropical Medicine. Part I. (ii) Malaria in the Eastern Mediterranean. With Special Reference to its Prevention under the Conditions of Active Service.**—*Jl. Roy. Nav. Med. Serv.* 1923. Apr. & July. Vol. 9. Nos. 2 & 3. pp. 137–144; 186–190. With 5 text figs.

v. Watson (Malcolm). **The Control of Malaria. A Tribute to the Genius of Sir Ronald Ross on the Twenty-fifth Anniversary of his Great Discovery.**—*Jl. Trop. Med. & Hyg.* 1924. Jan. 1. Vol. 27. No. 1. pp. 6–7.

i. In discussing this paper Le Dantec says that its title might fitly be "Paradoxical Effects of Quinine," points out the almost complete absence of microscopic control in the seven cases mentioned, notes that one of the three fatal cases had dysentery and probably excess of emetine, and that the two others received at a dose 3 gm. (45 gr.) of quinine, which he characterises as brutal therapy.

ii. The treatment advocated is 18 gr. of quinine hydrochloride daily, in doses of 3 or 4 gr., as a pill, an hour or more before a meal and at bedtime.

taking at the same time 3 or 4 ozs. of water, and continuing thus for two months. No figures of results attained are given, but these are held to be good.

iii. Neosalvarsan in doses not exceeding 0·3 gm. combined with quinine have given results in chronic malaria which are described as magnificent.

iv. The essentials of an antilarval campaign in the terrain under consideration are detailed.

v. The subheading is emphasized by instancing the heavy jolt given to the hold of malaria upon Carey Island and Singapore by Ross's discoveries which, it is estimated, have in Malaya alone saved 100,000 lives.

C. L.

Delgado (Honorio F.). **Treatment of Paresis by Inoculation with Malaria.**—*Jl. Nervous & Mental Dis.* 1922. May. Vol. 55. No. 5. pp. 376–389.

Krassnig (Max). **Der Einfluss der Malariatherapie auf die metaluetischen Störungen des Akustikus.**—*Med. Klin.* 1924. Jan. 6. Vol. 20. No. 1. pp. 7–9.

Scripture (E. W.). **The Treatment of General Paralysis by Malaria; The Use of Speech Inscriptions for Early Diagnosis.**—*Jl. Mental Sci.* 1923. Jan. Vol. 69. No. 284. pp. 77–83. With 2 figs. [7 refs.]

Templeton (W. L.). **The Treatment of General Paralysis by Malaria.**—*Brit. Med. Jl.* 1923. May 26. No. 3256. pp. 895–896. [5 refs.]

MISCELLANEOUS.

BOMBAY. **Report of the Bombay Bacteriological Laboratory for the Year 1922.** [MACKIE (F. P.). Offg. Director.]—15 pp., with 1 chart. 1923. Bombay: Part II. Government Central Press. [Price, Re. 0-4-6.]

Antirabic treatment at this laboratory dates from April, 1922. The vaccine adopted is the carbolized fixed virus introduced by SEMPLE; it is bottled in ampoules containing 5cc. and 25cc. respectively and is stored in a refrigerator. Centres for treatment were opened at five places in the Province. 429 cases were treated at the laboratory, of which 60 per cent. were bitten in Bombay City. 175 other cases were advised that treatment was unnecessary, being 25·9 per cent. of persons presenting themselves. At the branch centres 246 were treated.

Research work done by Hamilton FAIRLEY and Glen LISTON showed that three different agents were responsible for the manifestations of dracontiasis; the guinea worm produced the early systemic symptoms, such as urticaria, the embryos caused a sterile subacute abscess, and bacterial infection was responsible for the serious symptoms, cellulitis and the like. Antibody could never be demonstrated by the Bordet-Gengou reaction, nor did the injection of extracts of the worm lead to its elaboration. The observations of MACFIE on the efficacy of tartar emetic treatment were not confirmed.

Owing to the danger of human bilharziasis becoming endemic in India introduced cases have been treated with tartar emetic with a view to eradication of the infection. The use of a specific serological reaction in 25 cases suggests a doubt whether clinical cure is real cure. Sixty goats were experimentally infected with *S. spindalis*; tartar emetic was found to exert a definite lethal effect on a majority of the schistosomes, but only exceptionally was complete cure established in heavily infested goats. Living ova were demonstrated in the intestinal mucosa after prolonged treatment, when the faeces were negative for ova.

Dr. S. N. GORE has devised a simple method for the examination of water, based on the detection of indole-producing bacteria.

A. G. B.

CALCUTTA. **Report of the Pathological Laboratory of the Medical College Hospitals, Calcutta, for the Year 1922.** [SHANKS (G.), I.M.S., Professor of Pathology and Bacteriologist to the Govt. of Bengal.]—15 pp.

In this Laboratory in 1922 6,396 examinations were carried out, but only 51 autopsies, in cases where the bodies were not claimed. In the course of routine blood cultures in febrile cases two *B. pestis* infections were discovered; clinically there was no suspicion of plague. It having been ascertained in 1921 that all suspected kala azars that were positive in the formalin test showed leishmania in spleen smears, spleen puncture was not carried out in 1922 when the serum was positive by formalin, except in early cases in which the formalin test fails. There is a popular impression in Calcutta that kala azar serums give positive Widals in the absence of previous infection with enteric or prophylactic inoculation. This belief was tested experimentally on a number of early and late kala azar cases and found to

have no foundation. "Their sera never showed positive agglutination to any of the antigens in any dilution used." Three patients, 2 European, developed kala azar after infection with *B. typhosus*. It is pointed out that any prolonged or debilitating disease predisposes to other infections, and that in each of these diseases the polynuclears are much diminished. There are a number of the usual tables.

A. G. B.

NEW HEBRIDES. **Report for 1921 & 1922. (No. 1161.) Appendix.** [DAVIES (Vernon), M.D.]—pp. 10–12. 1923. London. H.M. Stationery Office. [Price 6d. net.]

Dr. Vernon DAVIES gives an account of the diseases met with at the Paton Memorial Hospital, Vila, and elsewhere in the New Hebrides. Naturally they do not differ much from those of neighbouring groups of South Sea Islands. The chief causes of sickness are stated to be tuberculosis, malaria, filariasis, amoebiasis, yaws and pneumonia. From enterica, plague, cholera, small-pox, bacillary dysentery and diphtheria the group appears to be free. Tuberculosis accounts for one-third of the deaths in the Vila hospital; the pulmonary form is most common, but inflammation of the cervical glands, joint tuberculosis and meningitis are frequent. Malaria is widespread and the greatest cause of ill-health among non-natives. Filariasis is generally distributed, but with unequal incidence in the islands; elephantiasis is seen on some islands but not on others. Muscular swellings, sometimes going on to abscesses, are frequent and are believed to be of filarial origin. Amoebiasis is endemic throughout the year and tends to become epidemic in January and February, when flies are at their worst; it is an important cause of death in all the villages. Yaws must cause much chronic ill-health. A form of periostitis affecting commonly the tibia, but "almost any bone," especially those forming the elbow joint, is attributed to yaws, but has occurred in Europeans who have shown no sign of that affection. Neosalvarsan fails; potassium iodide is successful. Gangosa is often seen. Leprosy is "scattered about the group." The author has never diagnosed syphilis, gonorrhoea is increasingly common, ulcerating granuloma is met with. Tropical ulcer and scabies are common. No investigation of hookworm has been made. The author hopes that "these islands still being virgin soil pathologically will attract a small laboratory." [See also this *Bulletin*, Vol. 17, p. 235.]

A. G. B.

MESLIN. **Considérations générales sur la morbidité et la mortalité en Annam pendant l'année 1921.**—*Ann. de Méd. et de Pharm. Colon.* Paris. 1923. May-June-July-Aug. Vol. 21 [22 *sic*], No. 2. pp. 174–182.

In the colony of Annam there are 20 native hospitals, and the number of admissions in 1921 was 29,127. Malaria came first with 2,861 cases and 175 deaths; benign tertian is the common form in summer,

subtertian and quartan between October and March. The malaria index (blood and spleen) for villages inspected ranged between 40 and 50 per cent., and in some villages was 90 per cent. Syphilis affects all classes of society both in town and country. Tuberculosis is common among the lower classes; 685 cases were treated. About 95 per cent. of the patients admitted into hospitals harbour intestinal worms of some sort. The number of admissions for taeniasis was 348, and of filariasis only 12. There were 36 cases of amoebic liver abscess. A good many cases of deep-seated, insidious, apyretic abscess of muscles were observed, where no infective agent could be discovered. Trachoma and various forms of conjunctivitis furnished 1,920 cases. Among tumours several cases of sarcoma are specified. Diabetes was not encountered. The statistics for epidemic diseases deal with reported cases, and are as follows: smallpox, 295 cases, 29 deaths; cholera, 261 cases, 140 deaths; plague, 242 cases, 205 deaths; measles, 317 cases, 59 deaths; influenza, 593 cases, 80 deaths. The numbers of vaccinations effected were: variola, 608,832; cholera, 10,000; plague, 8,921, and 13,582 re-vaccinations.

A. A.

Mathis (C.). **Considérations générales sur la morbidité et la mortalité au Cambodge pendant l'année 1921.**—*Ann. de Méd. et de Pharm. Colon.* Paris. 1923; May-June-July-Aug. Vol. 21 [22 *sic*]. No. 2. pp. 153–163.

In Cambodia in 1921 there were recorded for plague 446 cases, 439 deaths, and 9,375 vaccinations; for cholera, 1,054 cases, 674 deaths, and 9,780 vaccinations; for smallpox 462 cases and 178,500 vaccinations. The difficulty of preserving variola vaccine during distribution in the interior districts was overcome by packing the tubes in ice in thermos flasks. Influenza reappeared, but in a benign form. There were treated in hospital 72 cases of measles, of which 4 were fatal, and 90 cases of beriberi, of which 9 ended fatally. Tuberculosis is believed to be widely prevalent; 137 cases were treated in hospital and 59 deaths were recorded. Yaws is very common; in adults it yielded readily to 914, and in children to "liquor van Swieten." Of lepers 94 were interned in institutions; but the authorities are averse to interning any but those who have no means of subsistence, and would prefer that others should live near a leprosy dispensary for treatment: promising therapeutic results were obtained with iodosalyl chaulmoogra. Of rabies, 52 cases were treated, with 1 death—a child of 3 years: 21 rabid dogs were killed. The number of cases of amoebic dysentery treated was 380, with 55 deaths; no other form of dysentery is here recorded. Nothing of particular importance is mentioned regarding malaria, and nothing at all is said of helminthiasis or of venereal disease. The abuse of Indian hemp is noticed as a cause of insanity. Among the 467 maternity cases treated in institutions there were only 2 cases of twins.

The total number of cases treated in native hospitals of the colony was 6,650.

A. A.

Le Dentu (R.). **L'état sanitaire de la population indigène et le fonctionnement du service de l'assistance médicale dans la colonie de la Haute-Volta pendant l'année 1922.**—*Ann. de Med. et de Pharm. Colon.* Paris. 1923. May-June-July-Aug. Vol. 21. [*22 sic.*] No. 2. pp. 133–153.

Epidemic diseases.—*Relapsing fever*, hitherto unknown, was introduced into the Soudan in 1920 by native troops returning to their homes, and, though lousing centres were established and cases were isolated, it reached the Upper Volta colony across the Niger. It appeared first at Dori in the north in August, 1921. Thence it steadily spread. In eight named villages with a population of 5,376, 970 were attacked and 545 died. Body lice were the vectors. The symptoms were not unusual; epistaxis was frequent and jaundice never wanting. The natives distinguish relapsing fever from malaria by the pronounced prostration which is evident from the first.

Cerebrospinal meningitis, smallpox and influenza were infrequent this year. *Broncho-pneumonia* was very common in December, January and February, when a cold north-east wind blows; the disease is attributed to lack of clothing and susceptibility to the pneumococcus. *Anthrax* occurred in two villages where infected sheep and goats were eaten. Chickenpox and mumps affected the schools.

Endemic diseases.—Malaria is always frequent. In the absence of running water the natives make hollows in the ground in and round their villages; here Anopheles breed. Often these are borrow pits made in the course of construction of their huts. Both forms of dysentery are said to occur; the bacillary variety is mild. Venereal diseases are spreading in the villages. Sleeping sickness is found only in the region of the Black Volta. At one point two species of tsetse were captured, and here trypanosomes were detected in the blood of 8 out of 12 natives. Trypanosomiasis of horses is common in all the south of the colony, so that they are reared with difficulty. Guineaworm infection is widely spread. After the first rains the number of cases augments, to attain its maximum in mid-winter. *Taenia saginata* occurs in 50 per cent. of persons living round European stations. Leprosy exists chiefly in the south-west. Goitre is common, especially in women; children are seldom affected. Filariasis with lymphocele and hydrocele are common enough, but elephantiasis is rare. Intermittent haematuria is attributed (without parasitic evidence) to bilharziasis.

Infantile mortality.—This is high. It is attributed partly to pulmonary affections due to lack of clothing, to asphyxia in the efforts of the mother to keep the child warm at night, to green diarrhoea, the result of improper diet. Tetanus is not an important cause. Among serious faults of hygiene is cited the habit of the Massi women, who fill the mouth with water, usually dirty, and blow it into the rectum of the newly born child, for what purpose is unknown.

Medical relief.—There are nineteen dispensaries in the colony served by six European doctors, and two native midwives trained at the Dakar school. Among the diseases seen malaria accounted for 3,655, guineaworm 1,540, syphilis 793, goitre 399, tuberculosis 27, sleeping sickness 3.

Vaccination.—There are three vaccine farms, which in this year supplied 738,500, 218,200, and 225,000 doses of vaccine. It is sent

out once a fortnight, in earthen water-containing vessels on men's heads ; the water is renewed as often as possible. Vaccination is not done in the hot weather. The native vaccinators number 30. Of 467,000 vaccinations performed in the year about half were verified, and of those 57 per cent. took. Experiments with dry vaccine gave better results, but it is not considered wise to entrust the admixture with glycerine to natives.

A. G. B.

SERGENT (Edmund). **Rapport sur le fonctionnement de l'Institut Pasteur d'Algérie en 1922.**— *Arch. Instituts Pasteur de l'Afrique du Nord.* 1923. May. Vol. 3. No. 2. pp. 193–230. [60 refs.]

This extremely interesting Report of the Pasteur Institute of Algiers, for 1922, is a fine record of service not only for the public health but also for the economic development of that country.

From its first section, which deals with the routine work of the Institute, we learn that in 1892 the number of microscopical examinations, cultures, inoculations, serological tests, etc., carried out in behalf of the medical, veterinary, and agricultural departments was 8,062, and of chemical analyses 336 ; and that 2,810,965 units of vaccines, sera and other such biological products were issued, exclusive of those used in antirabic treatment. In the antirabic department 1,662 individuals were treated for bites inflicted by animals, which in 36 cases were proved to be rabid, in 579 cases were judged to be rabid from their symptoms, and in the remaining cases were suspected of being rabid ; of the individuals treated, 3 died of rabies. In the routine of the malaria department minor periodic measures of cleaning, petrolage, etc., were continued in numerous districts. 180 kilos of quinine hydrochloride were distributed in the form of dragées, and 4·2 kilos in the form of chocolatines, and several thousand leaflets and pamphlets were circulated, as well as a " Précis of Malaria " for use in schools. Several scientific expeditions were organized, including a great malarial survey of Algeria, the chart of which will be published this year ; and a laboratory has been established at Biskra to study the biology and pathology of the Sahara. Among other matters referred to in this part of the report is the publication in French and Arabic of a little book of a popular sort entitled "Le Livre de la bonne Santé."

The second section of the Report contains an account of the original work done in the Institute during the year. As most of this work has been published, and has been noticed in this *Bulletin*, we may here rather contemplate the spirit in which the work was done than the material results of the work itself. The leading motive of the Institute—and undoubtedly it is a motive that above all others justifies the supremacy assumed by Western Europe in the affairs of Africa—is in co-operation with the medical officers of the army of occupation to make the country healthy for the native inhabitants by rousing them from their pathetic fatalism in the face of epidemic disease. In the case of malaria the proposed standard of achievement is that exhibited by the plain of Mitidja. In former times this plain was a wilderness of Pistacia scrub and malaria swamp : to-day it is a vast expanse of cornfields, vineyards, and orangeries—an appropriate transformation for the country where the malaria parasite was discovered. Of the 28 original papers briefly reviewed in the Report,

14 relate to malaria, the other 14 deal with specific problems of relapsing fever, diphtheria, tuberculosis, enteric fever, undulant fever, oriental sore, and protozoology.

A. A.

Da Costa (E. Borges). **Institut de Radium de Bello Horizonte, État de Minas Geraes (Brésil).**—*Presse Méd.* 1923. Oct. 20. Vol. 31. No. 84. (Supplement.) pp. 1757–1759. With 4 figs.

In 1919, the President of the State of Minas Geraes, the most populous of the Brazilian States, having regard to the increase of cancer in Brazil as elsewhere, suggested the foundation in the State of an Institute for the study and control of that disease. Hence the Radium Institute at the capital of the State, which is here described. It is managed by a Council of Ten, which elects the Medical Director. Its aims are—the study and treatment of cancer and precancerous conditions; the study of radium and radio-active substances; the diffusion of advice and instruction to the public about cancer; the study of experimental surgery as an aid to surgical therapeutics. The building, which has cost over two million francs, is figured in plan and facade; it comprises a hospital of 120 beds. The Director is Dr. E. Borges da Costa, the writer of the note.

A. G. B.

Atkey (O. F. H.). **Kitchener Memorial Medical School at Khartum.**—*Brit. Med. Jl.* 1923. Sept. 29. pp. 581–582.

The object of the Kitchener Memorial Medical School, writes Dr. Atkey, is to provide a sound medical training for young Sudan Arabs so as to meet the need for doctors which at present exists and is likely to grow quickly with the development of the Sudan. That there is a demand for such a school from the natives is shown by the fact that they have themselves subscribed £11,000. It is intended to train young men selected from the final year students of the Gordon Memorial College, men therefore who have had a sound secondary education, at the outset twelve for a period of four years. Work in the out-patient department will begin simultaneously with the study of the preliminary sciences, and those who finally attain the standard fixed will receive a diploma to practise in the Sudan, where they will be under the direction of British medical inspectors. Later the standard will be raised and the curriculum prolonged to five years. The medical school is now in course of construction, opposite to the Civil Hospital of 100 beds, where the clinical training will be pursued. As to the need for the school, it is pointed out that there are immense areas throughout the Sudan, and especially in the southern regions, in which the population is far out of reach of any hospital or the visitation of Government Medical Officers, and where epidemics are unchecked. The diseases which have to be combated are discussed, schemes for the growth of cotton on a colossal scale are sketched, and the necessity indicated of a steady increase of the population, for which adequate medical and hygienic arrangements are essential. Moreover, "the quickest and surest way to pacification and civilization in Central Africa is to increase enormously the number of doctors."

May Dr. Atkey's project meet with the success it merits.

A. G. B.

LE DANTEC. **L'enseignement médical dans les colonies françaises.**—*Congrès de la Santé Publique et de la Prévoyance Sociale, Marseille, 11–17 Septembre 1922. Rapports.* pp. 355–388.

In this valuable paper the Director of the French West African School of Medicine at Dakar gives the story of the inception and development of medical teaching in the French Colonies, a subject which is or should be of great interest to our Crown Colonies in Africa and elsewhere. The creation of the medical school in Pondichery, French India, goes back to 1863 [1823 according to GUERIN], that of Madagascar to 1897, and of Indo-China to 1901. In French Africa, with its backward population, no school was founded till 1918. (See this *Bulletin*, Vol. 17, p. 218; Vol. 18, pp. 283 & 284.) Of each of these schools a full description is given, dealing with the selection of candidates, their maintenance, training, discipline, examination tests, and opportunities when qualified, the staffing, course of study. buildings and apparatus. In all the schools midwives are also trained, and in some pharmacists and *infirmiers*, the qualification of whom is that they have knowledge of French and have spent at least six months with a sanitary corps. The African school, though the last to come into existence, is in some respects in advance of the rest, for it has veterinary pupils who, as on the medical side, pass through a five years' course.

The author tells us that these schools are not the result of a demand from the natives, but of the need for medical personnel. The vastness of these territories, the difficulty of communications, call for numerous qualified men which the mother country cannot provide nor the colony pay for. On the other hand, the élite of the native youth, sharing the origin and language of the natives, are eminently suited for such work, and the pupils should be recruited from all the native races, so that they may practise among peoples whose traditions and language are essentially their own. At first it was believed sufficient to train good *infirmiers*, but it was found that they could not bear responsibility. A long training, moral as well as technical, is necessary if the native is to stand alone. At two of the schools the pupils are boarders, at two they live out. Le Dantec prefers the interne system, because the students have much to learn besides the essentials of their profession, and, living in, they become more quickly habituated to speaking and thinking French. They have uniform or at least European wear, which also helps to Europeanize their minds. Since the training is intended to adapt them to practise in their own country, the teaching is fitted to its pathology and hygienic needs, and here the author notes that there exists no work on tropical medicine as it affects the yellow or black races. The cinema is used for instruction at Dakar and Hanoi. In return for financial assistance, taking the form either of board or of money, the students sign an engagement to remain at least 10 years in the medical service of the country, and they are held to this by prohibition from practice except in that service. The bonds between the school and the student must not be broken when he graduates; he should be recalled at intervals for instruction, and it is necessary that the European instructors be changed as seldom as possible.

The midwife pupils spend their first year in the practice of the hospitals and dispensaries in the service of women and children; they are intended to advance hygiene as well as to act as accoucheuses.

Lastly, it is considered that the formation of these native schools of medicine will enable the French to combat with increasing success the well-recognized causes of depopulation, and so to contribute to the economic prosperity of the colonies.

A. G. B.

BORREL. **Hygiène et pathologie des contingents coloniaux en France.**—*Congrès de la Santé Publique et de la Prévoyance Sociale, Marseille, 11–17 Septembre 1922. Comptes Rendus.* pp. 62–78.

"It was the Senegalese troops that first attracted attention when, replacing the old veterans, the new recruits of 1915 came straight from the Bush to serve in France."

Borrel gives a vivid description of the arrival at Fréjus Camp of a battalion from Dakar after a fortnight or so of sea travel under anything but hygienic conditions: first the press of men to hospital with dysentery and pneumonia; then the gradual cessation of bowel complaints but a persistence of the pneumonias, broncho-pneumonias, congestions and attacks of bronchitis—all due to the pneumococcus—for the first three months or so. "*Et puis tout rentrait dans l'ordre, l'état sanitaire était parfait.*"

But this three months period of acclimatization cost, per 1,000 of strength, 150 or 200 cases of illness and 20 or 30 deaths.

Attempts to protect against pneumonia by means of vaccines were successful to a very considerable extent, especially when carried out during warm weather. They were less successful in winter-time. It was soon discovered that there was no need to vaccinate against pneumonia except during the first year of service in France. "*Il est donc inutile de vacciner les contingents anciens, la vaccination artificielle n'ajouterait rien à la vaccination naturelle.*"

In an experiment, for instance, on the battalions returning to Fréjus from the front after a winter in the trenches, 3,580 men were inoculated, 3,590 men were kept uninoculated as "Controls," and the incidence and mortality from pneumonia was carefully recorded in each group. The result was as follows:—

Amongst the Inoculated.—20 cases and no deaths in 3 months.

Amongst the Non-Inoculated.—24 cases and 1 death in 3 months.

It is clear that the non-inoculated were no more susceptible than the inoculated men. Compare with the above, an observation on a Madagascar Contingent just arrived at Fréjus Camp and inoculated with the same vaccine.

283 *Inoculated.*—1 case and no death.

213 *Non-Inoculated.*—17 cases and 4 deaths.

As Borrel says: "It is thus established that vaccination against the pneumococcus takes place naturally and spontaneously during the first year of acclimatization."

If pneumonia may be regarded as the outstanding risk to the African soldier in his first year, tuberculosis takes its place for all subsequent years of service in Europe, as will be clearly seen from

the following table based on the deaths from this disease at Fréjus Camp in a garrison with a fairly constant strength of about 50,000 men during 1917 and 1918.

Deaths from Tuberculosis at Fréjus Camp.

Années.	1916.	1917.	1918.	1919.
Janvier	1	14	17	36
Février	0	20	35	48
Mars	2	21	50	62
Avril	3	28	73	80
Mai	2	41	104	72
Juin	7	37	59	—
Juillet	7	32	67	—
Août	4	23	52	—
Septembre	6	27	38	—
Octobre	4	25	54	—
Novembre	3	19	43	—
Décembre	9	25	55	—
	48	312	557	298

These two diseases, pneumonia and tuberculosis, account for 95 per cent. of the morbidity of the Senegalese troops in France. The clinical picture on admission tends to afford a sharp contrast between the muscular, well-nourished, glossy-skinned pyrexial pneumonic patient and the dull-skinned, flaccid case of phthisis with oscillating temperature and, in many cases, palpable glands above the clavicle. "The diagnosis of tuberculosis in the Negro is very easy provided that, in the case of the Senegalese at least, one does not complicate matters by seeking for auscultatory signs."

In the course of inoculating the 7,000 Senegalese already quoted against pneumococcus infection, the importance of tuberculosis came into into sharp relief, many men being found to be suffering from this disease. It will be seen from the following table that battalions tended to differ, owing, no doubt, to differences in the number of infected persons in their ranks.

Battalions	71st.	68th.	60th.	44th.	77th.	64th	70th	43rd.
Tuberculosis cases ..	2	7	17	5	1	4	4	3

A Table of periods of survival after admission to No. 66 Senegalese Hospital amongst 35 patients dying of tuberculosis is given by Borrel on page 68. *In this table it is seen that no less than 14 out of the total of 35 were dead within two months of admission, while the longest period of survival was 5 months and 16 days.* Borrel, attributing this to the reluctance of the Senegalese soldier to leave his comrades and enter hospital, instituted a system of "Diagnostic Inspections" of battalions, examining in this way the whole garrison of Fréjus camp once every month. The results, from June 1918 to May 1919, are given in the following table.

Table of Cases of Tuberculosis detected at Battalion Inspections.

	Dépistés.	Tuberculeux.
Juin 1918	170	100
Juillet	105	46
Août	94	48
Septembre	128	51
Octobre	108	29
Novembre	96	36
Décembre	158	85
Janvier 1919	257	150
Février	245	158
Mars	298	164
Avril	167	66
Mai	155	37
Total	1,981	970

By means of these diagnostic inspections Borrel was able to eliminate many potential foci of infection in the ranks, and he regards this "Monthly Inspection" as a matter of prime importance in the control of tuberculous disease amongst Colonial contingents serving in Europe.

In this paper the other causes of inefficiency amongst Colonial troops are also considered. Dysentery is regarded as very rare except as the immediate result of insanitary conditions on ship-board during the journey to France. Phagedenic ulcerations due to aggravation of old "jigger sores" are frequently seen on disembarkation, and may be very severe. They are caused by the absence of facilities for foot-washing during the voyage.

Another source of trouble is the marked tendency to "Frost Bite," attributable to the poor peripheral circulation of the Senegalese. Good food, warmth, suitable clothing and a winter spent in a dry, sunny camp as at Marseilles or Fréjus will go far to keep these troops fit. "*Il faut s'occuper des tirailleurs si on veut les utiliser.*" Borrel gives a delightful sketch of the cheerful, thoughtless, improvident but faithful and gallant Senegalese tirailleur, so devoted to the officers that treat him well, so amenable to discipline if this is tactfully and firmly administered. As one reads between the lines of his concluding paragraphs, one feels his generous admiration for a splendid military type, his sympathy for their dangers and sufferings in the cause of France. To a reviewer who has served with Sudanese troops this appreciation for the high qualities of the African warrior makes a deep appeal.

S. L. Cummins.

Nattan-Larrier (L.) & Laigret (Jean). **Les porteurs de germes et le recrutement de l'armée indigène.**—*Congrès de la Santé Publique et de la Prévoyance Sociale, Marseille, 11–17 Septembre 1922. Rapports.* pp. 263–276. [16 refs.]

The authors discuss the possible introduction of exotic diseases to Europe and of infections peculiarly associated with temperate civilization to the tropics as a result of the recruitment and dispersal of the great French native army. The question of the introduction of disease came up in 1910, when it was decided to transfer 800

Senegalese troops to Algeria, and the Société de Pathologie Exotique was asked to indicate what precautions should be taken. The sequel in this instance showed that though large numbers of natives were enlisted and were associated with French troops in many parts of the world they nowhere constituted a danger. It was rather the native troops that were threatened, by infections such as pneumonia and tuberculosis (BORREL). It is probable that they took tuberculosis back with them, for the disease has spread in French colonies since 1914, and they appear to have introduced relapsing fever into the French Sudan where the disease had not been known before [see this *Bulletin*, Vol. 20, p. 132]. It is concluded that the prophylactic measures taken before embarkation of the native recruits for France or Algeria proved effective. A period of observation of three months at this stage is none too long, both for examination and acclimatization, but is rarely practicable. The French Sudan experience suggests that before repatriation native troops should be loused.

A. G. B.

i. van BOECKEL (L.) & GEENS (J.). **Valeurs antigénique et immunogène comparatives des vaccins simples et des vaccins mixtes contre certaines infections à germes entérotropes.**—*C. R. Soc. Biol.* 1923. Oct. 20. Vol. 89. No. 28. pp. 844–848.

ii. ——, & ——**De l'influence du nombre des injections dans les vaccinations contre certains germes entérotropes.**—*Ibid.* pp. 852–856.

i. Experience in the war seemed to be decisive that for comprehensive protection against the enteric fevers a mixed T.A.B. vaccine was essential. The inferences drawn from the experiment fully recorded in this paper are that while for the individual exposed to frequent and varied risk and precluded from undergoing a series of independent simple vaccinations a mixed vaccination is convenient, yet for ordinary epidemic conditions a simple *ad hoc* vaccination is sufficient.

The authors' experiments show, in fact, that to a mixed vaccine, composed of equal quantities of different species of germs all provoking individually high antigenetic reactions, the organism generally reacts only to one of the species strongly, very seldom to all of them, and hardly ever to all of them equally strongly ; as judged by agglutination tests 10 to 12 days after inoculation, one of the species seems to inhibit, either entirely or in part, the antigenetic powers of the others.

It must suffice here to give merely qualitative abstracts of the tabulated results of these interesting experiments :—

Ten rabbits received each a subcutaneous injection in saline solution of 2 milliards of killed bacilli consisting of equal quantities of (*a*) typhoid, (*b*) paratyphoid A, and (*c*) paratyphoid B : 4 animals reacted to *a* only and 1 to *c* only ; 3 reacted to both *a* and *c* but unequally ; 2 reacted to all three species, but most strongly always to *a*. Eight rabbits received a numerically and physically similar injection consisting of equal quantities of (*a*) typhoid, (*b*) para B, (*c*) Flexner, and (*d*) cholera bacilli : 1 animal reacted to *a* alone, and 1 to *c* alone ; 2 reacted to *a* and *b*, and 1 to *a* and *c* but unequally ; and 2 reacted unequally to *a*, *b*, *c* and 1 to *a*, *c*, *d* ; none reacted to all four species. Six rabbits received a physically similar injection consisting of 2 milliards of a mixture of equal parts of (*a*) typhoid, (*b*) para A, and (*c*) para B, and 4 milliards of (*d*) cholera bacilli : 1 animal reacted to *a* alone ; 1 reacted to *a*, *c*, and 1 to *a*, *d*, but unequally ; and 2

reacted to *a*, *c*, *d*, and 1 to *a*, *b*, *c*, but unequally; none reacted to all four species. Eight rabbits received an injection, in oily suspension, of a mixture of 4 milliards of typhoid bacilli, and 2 milliards each of para A and para B bacilli: 1 animal reacted to typhoid alone; 4 to typhoid and para B, but in only one case equally; and 3 to all three species, but only in one case equally.

The authors also describe unsuccessful attempts to immunize rabbits against paratyphoid and dysentery and paratyphoid and cholera by mixed vaccines, in contrast with successful immunization by the respective simple vaccines in succession.

ii. It is known that, despite individual exceptions, the formation of anti-bodies and the degree of immunity acquired as a result of protective inoculation increase, up to an optimum, with the amount of antigen introduced at a given time. There is not, however, complete agreement—though there is a considerable amount of affirmative experimental evidence—on the point whether or not the phenomena in question are favourably influenced by a succession of inoculations. The authors therefore have made a number of experiments on animals and man, which are recorded in tabulated detail in this paper, to throw more light upon this question. The following are their conclusions: (1) That the human subject inoculated several times with a given quantity of antityphoid vaccine produces antibodies in greater abundance than the subject who receives the same quantity of germs at a single inoculation. (2) That with animals [rabbits and guineapigs] inoculated with a given quantity of paratyphoid, dysentery, or cholera vaccine, the abundance of antibodies produced and the degree of immunity acquired is in direct increase with the number of injections in which that quantity is distributed [1 to 4 injections at 8 days' interval, where recorded in the tables]. (3) That to secure solid and lasting immunity, as in the army, etc., 3 or 4 successive inoculations are preferable to the 1 or 2 that are desirable in pressing circumstances.

A. A.

CALMETTE (A.). **Les vaccinations microbiennes par voie buccale.**—*Ann. Inst. Pasteur.* 1923. Oct. Vol. 37. No. 10. pp. 900–920. [91 refs.]

A considerable volume of experiment has undoubtedly justified the principle of immunization against certain bacterial diseases by the buccal route, although further experimentation is necessary to determine the limitations and practical quantifications of the method, since at present it is not known (as, of course, it is known in the case of other established routes) what proportion of the immunizing vaccine is actually absorbed. The buccal route, however, offers so many practical advantages that the author, while still advocating caution, has thought it worth while to review the whole subject in its history and development, for practical ends.

The idea of vaccination *per os* naturally occurred to PASTEUR after he had observed that fowls that had eaten food contaminated with the microbe of chicken cholera, if they survived the accident, were vaccinated. In putting this observation to the proof of deliberate experiment with anthrax vaccine and sheep, however, the buccal method was found to be so inconstant in comparison with the certified subcutaneous method that further attempts at its development were discontinued. EHRLICH also, many years after PASTEUR, tried oral

vaccinations, only to reject them as obviously inferior to the established methods. Many other authorities (including METCHNIKOFF and the author) also have experimented with oral vaccines, and have obtained satisfactory evidence of the production of antibodies, particularly in the case of microbes like those of typhoid and dysentery, which by recent research—in particular the bile sensitizing investigations of BESREDKA—have been shown to have a predilection for the intestinal mucosa, by whatsoever route they are introduced into the body.

1. *Buccal vaccination against bacilli of the enteric group.*—From the earliest experiments it was concluded that the immunity thus conferred was a temporary "tissue immunity" localized in the intestinal mucosa and not protective against infection by other routes than the mouth. But in 1911 COURMONT and ROCHAIX administering to rabbits and goats, *per os* and *per rectum*, mixtures of several strains of enteric cultures killed by heat, conferred immunity lasting for 3 to 6 months, and found that the animals' serum was agglutinant and lytic. Later, LUMIERE and CHEVROTIER administered polyvalent antityphoid vaccines by the mouth in keratine capsules, to avoid loss in the stomach, and with charges of 3 milliards of microbes per kilogm. of animal, given in three doses at intervals of eight days, obtained for rabbits and guineapigs an immediate immunity, which held good for a year, against virulent infection in mortal doses. These "enterovaccines" have been freely and satisfactorily used since 1914.

The author refers to BESREDKA's experiments with rodents demonstrating the selective affinity of typhoid bacilli for the intestinal mucosa, through the "sensibilizing" action of bile; and to buccal vaccination with bile as an adjuvant, although he does not consider bile necessary in the case of man. Finally, he gives statistics of two outbreaks of typhoid fever in which buccal vaccination was tested in comparison with subcutaneous injections of T.A.B. In one of these, at Pas-de-Calais, vaccination was started after 29 cases had occurred, and 30 cases occurred after vaccination had been instituted: among 1,236 persons who ingested vaccine (+ bile), 5 were attacked the same day or the next, and 2 were attacked 10 days afterwards; among 173 persons inoculated with T.A.B., 4 were attacked between the fifth and twelfth day afterwards; and of 630 persons who refused vaccination 21 were attacked; the ingestion of microbes and bile, however, was not superintended by a responsible medical officer. In the other outbreak, at the Prytanée of La Flèche, vaccination was not started until the epidemic was declining: 253 pupils were then vaccinated subcutaneously with T.A.B., and 268 ingested killed bacilli (+ bile); among the former 10 were attacked during the 20 days following, and among the latter only 5 were attacked during the first 11 days before the cessation of the epidemic.

2. *Buccal vaccination against dysentery bacilli.*—ZEITLIN, in 1905, began by swallowing increasing doses of bacilli killed by heat, without any ill effect, but without the acquisition of any agglutinant or bacteriolytic power in his serum. Next SHIGA and his pupils succeeded in immunizing rabbits to intravenous injection of dysentery toxins, by ingestion of killed cultures of the Shiga bacillus, but the animals always died of paralysis within a few days, and the controls succumbed to diarrhoea, etc. Subsequently, DOPTER, from his experiments, concluded that buccal vaccination for man was an improbability. BESREDKA, however—who demonstrated the "enterotropism" of the dysentery bacilli, by preliminary sensitizing of the intestinal

mucose with bile—while confirming the harmlessness of buccal vaccination and the non-appearance of antibodies in the serum of animals so vaccinated, concluded from his experiments on rabbits and mice that a single ingestion—or, better, two ingestions—of killed bacilli conferred immunity; and finally there is the practical experience of NICOLLE & CONSEIL (see this *Bulletin*, Vol. 20, p. 115), who administered emulsions of 10 milliards of virulent Shiga bacilli to four men, two of whom had 15–18 days previously ingested three successive daily doses of the heated bacilli: these two men were immunized, the other two contracted typical dysentery.

3. *Buccal vaccination against cholera.*—Though the intense "enterotropism" of the cholera vibrio, by whatsoever route it may be introduced, has been demonstrated experimentally, a similar enterotropism has been demonstrated for the vaccine, so that the established method of subcutaneous inoculation does not require modification.

4. *Buccal vaccination against other bacterial diseases.*—Experiments of GUERIN and the author have shown that animals can be rendered refractory to the tubercle bacillus for considerable terms by ingestion of non-virulent cultures of that bacillus.

It has been demonstrated (by the author and PETIT) that virulent staphylococci ingested by rabbits can be found in the animals' blood within six hours and can produce their effects spontaneously or after a traumatism; and, conversely, COURMONT and ROCHAIX have shown that rectal injections of heated cultures (70° C. for four hours) can retard the effect of virulent cultures subsequently injected into the blood, and also that by rectal injections of killed cultures of the pyocyanic bacillus immunity against that bacillus is conferred.

A certain amount of desultory experiment with vaccination *per os* or *per rectum* against plague, diphtheria, and bovine plague is also briefly reviewed.

Within the limits of an abstract, however, it is not possible to do justice to a long paper which itself is a summary of forty years' history of an idea: only a few salient points of practical significance have here been indicated.

A. A.

FERNANDEZ (H. E.). **Notes from the Diary of a Prison Doctor.**—*Med. Jl. S. Africa.* 1923. June. Vol. 18. No. 11. pp. 275–278. With 1 chart.

These notes relate to the convict prison at Point Natal, the average daily population of which, in the year 1922, was 566, and the average daily number of patients in hospital seven. There was a good deal of scurvy, although the scale of diet was reasonable and included cooked vegetables and, usually, soya beans. It had been the custom, however, to leave the food cooking or partially cooked for a long time before it was issued; when this custom was rectified there was a general improvement in the condition of the convicts. Actual cases of scurvy appear to have been effectively treated by the addition of a pound of tomatoes to the daily ration and an increase in the amount of meat. An extraordinary case of septicæmia is recorded. Nothing very much wrong could be made out with the patient until the 21st day after his first admission to hospital, when a considerable swelling appeared in the pubic region. On the 22nd day an intensely irritating papular rash appeared in that neighbourhood, which on the 23rd day

had spread over the head, trunk and thighs, becoming confluent in places. Scratching turned the papules into ulcers, the pus from which gave a pure culture of *Staphylococcus aureus*. After some rather profuse diarrhoea the patient died on the 24th day.

A. A.

Sorel (F.). **Relation d'un voyage de Dabola à Kankan-Kissidougou. Rives du Milo et du Niger et région de Dalaba (Fouta-Djallon).**—*Bull. Soc. Path. Exot.* 1923. July 11. Vol. 16. No. 7. pp. 496–500.

The object of this tour along the sources of the Niger was to get some idea of the incidence of malaria and of the infantile mortality. Very nearly 6,000 children were examined, and the number of those having enlarged spleens ranged according to locality from 31·7 to 54 per cent., being highest in the villages nearest to the river. It was noticed that in the collections of children assembled at the villages those under four years were generally about twice as numerous as those above seven, suggesting a high mortality between those ages. Infantile death-rate was arrived at by questioning the matrons, and although the author gives some exact figures it is perhaps sufficient to say that according to the matrons' testimony nearly 5 per cent. of infants die almost as soon as they are born and about 50 per cent. die before the age of 4–5 years.

A. A.

Comby (J.). **La question du paiement des soins médicaux par les indigènes au Maroc.**—*Presse Méd.* 1923. June 13. Vol. 31. No. 47. p. 982.

The French doctors in Morocco were asked by the authorities to recover from non-indigent natives the cost of drugs or dressings and of treatment in hospital. It was found that it was difficult for the doctor to distinguish the rich from the poor, that the country natives could not be expected to pay, that in the towns a varying percentage could pay, but preferred to go to a pharmacist or private practitioner, that such a result would prejudice the ultimate benefit of the country for a slight temporary advantage, and that the recoveries in six months did not exceed 45,000 francs. In Rabat, in March 1922, with gratuitous treatment 2,059 intravenous injections were given for syphilis. Two francs was asked per injection, and in March 1923 the figure fell to 866. Later, these neglected patients would apply for admission to hospital and receive a much more costly treatment.

A. G. B.

Whyte (G. Duncan). **Medical Missions.** [Correspondence.]—*Brit. Med. Jl.* 1923. Sept. 15. p. 488.

This letter is in the main a protest against the doctrine that any young medical graduate can be "too good"—in a professional sense, of course—"for the mission field." Quite apart from things of the spirit, the multifarious responsibilities—embracing many special branches of medicine, surgery, obstetrics, and hygiene—that fall upon a practitioner who commonly is sequestered from professional

assistance can be discharged only by a man of great ability and voluminous skill. [It is to be hoped that these excellent sentiments will be honoured by missionary societies as freely as they are endorsed by the medical profession.]

A. A.

BALFOUR (Andrew). **Problems of Acclimatisation.**—*Lancet.* 1923. July 14 & Aug. 4. pp. 84–88; pp. 243–247. [56 refs.]

These two lectures are a judicial summing up of much evidence regarding the effects of tropical climate upon the Caucasian, considered more particularly in their bearing upon the question of permanent European settlement in the tropics. For any but philosophers it is an exasperating subject, quite apart from its inherent perplexities; there is so little to take firm hold of; so much is merely general impression and opinion; and when one comes upon a few grains of fact they do but serve to start fresh controversy. The lecturer, however, has performed the good service of searching and sifting and systematizing this varied and uneven material, and out of the fulness of his experience has added to this critical analysis certain cautious conclusions that it will be sufficient to summarize.

He has no doubt, of course, that the individual settler in the tropics who takes care of himself can enjoy "a fair measure of health, for considerable periods at a stretch," and he also readily concedes that "a certain proportion of white men and a few white women can carry on active outdoor life in tropical heat year in and year out without much detriment to their physical and mental vigour." But in respect of permanent settlement, though at one time he was disposed to share the favourable view of GORGAS, he is now inclined towards the reactionary opinion "that the hot and humid tropics are not suited to white colonization and never will be, with our present knowledge, even if they are rendered as free from disease as England," while as to the dry and elevated areas within the tropics he still reserves his opinion, but not without foreboding. This foreboding he justifies by the doubt whether even in these favoured tracts the climate is sufficiently varied and changeful to impart that recurring stimulation which is so essential for the continual redintegration of mental vigour. [Here we seem to hear the echoes of the old haunting theme of the lotus eaters and perpetual summer afternoon.] In the peroration, however, the spirit of the lecturer rises above the misty wilderness of opinions and preconceptions and penetrates the veil of futurity: Hygiene has done much to defeat climate; can it not perhaps alter climate? "We are only beginning to realize what electricity can accomplish."

A. A.

BALFOUR (Andrew). **Sojourners in the Tropics.**—*Lancet.* 1923. June 30. pp. 1329–1334. [25 refs.]

This paper goes a good deal further than its title implies, since it deals not so much with the "sojourner" (unless in the Psalmist's sense of that word) as with the question whether the white man can ever make a settled home in the tropics. The author does not adjudicate this larger question, but in reviewing and marshalling the historic evidence as to the effects of climate on the descendants of

white men expatriated by fate or fortune in the tropics he gives a good illustration of the soundest of methods of getting an answer to that question. He has thus rendered good service in a field where at present there is a plentiful lack of perspicuous definition and where much of the "evidence" offered has been assertion, or prejudice, or half-truth, or argument from vague assumption. Even in treating the subject from the historic standpoint one is hindered, as the author points out, by ambiguity in the term "climate," so that what is really due to concomitant adverse conditions is often attributed directly to climate—to the overpowering rays of the sun, to great heat and humidity; and even those who endeavour to separate the effects of climate upon expatriated and isolated white communities from the effects of inbreeding have failed to understand that the term "inbreeding" requires to be carefully qualified, since (although inbreeding from bad stock must lead to degeneration) there is no historic evidence that inbreeding from thoroughly good stock has any bad results and, indeed, experimental evidence is all the other way.

In his survey the author, with full cognizance and appreciation of all the necessary limitations and qualifications of the evidence, but without any impossible attempts to be too explicit, begins with those more or less pure white communities whose ancestors were carried to the tropics a good many generations ago and ends with those which are still being reinforced from the original European sources. Of the former kind some, like the poor whites of Jamaica, Barbados, Grenada, and the Bahamas, are said to have degenerated physically and perhaps mentally; while others, like the descendants of the original European settlers in certain islands of the Caribbean and neighbouring seas (Saba, St. Martin, Curacoa, Cuba) and in Mauritius and the Dutch East Indian island of Kissa, are said to have maintained their pristine physical and mental vigour. Of the latter kind some, as in South Africa, are said to contain a considerable proportion of whites who have fallen below the ancestral standard; though others, as in Panama, Espirito Santo in Brazil, Rhodesia, and Tropical Australia, are far from showing any conclusive evidences of deterioration.

In the jar of conflicting opinions the author appears to have taken a "cross-bench" station—as, indeed, seems to be most reasonable to those who think of the wonders that have been worked by man since his first appearance on the geological horizon.

A. A.

HEWETT (Godfrey). **The Dusuns of North Borneo.**—*Proc. Roy. Soc.* 1923. Aug. 1. Ser. B. Vol. 95. No. B 666. pp. 157–163.

The Dusuns of Borneo—known to white men by the puzzling name of Sun Dyaks—claim to be, and have traditionally been allowed to be, direct descendants of former Chinese settlers. This claim has recently been impugned, on the ground that MARCO POLO said nothing about it. The author, therefore, as he considers the Dusuns to be the most interesting of all the tribes inhabiting Borneo and much deserving of scientific study, makes here an attempt to corroborate their avouched and legendary claims. Appealing to history, he states that when in the early part of the 13th century KUBLA KHAN established his sovereignty over China and the Malay States, the Chinese had a large sea trade, which extended even to Madagascar and Africa and brought the great Mongol emperor into

collision with the Indian monarch MAJAPAHIT, whose sway extended, through Sumatra and Java, to Sarawak, where Chinese trade had been carried on unchecked probably for 2,000 years. KUBLA KHAN'S attempt to extort homage and tribute from MAJAPAHIT by an invasion of Java failed, but tradition says that his invasion of North Borneo was successful, and that large Chinese settlements were established there. Furthermore the author cites Sulu records and the "Selesilah" of Brunei, in which a local potentate A.D. 1375 is described as the Chinese rajah. Appealing to circumstantial evidence the author points to wonderful irrigation channels, still in use in Dusun country, which could only have been made by skilled engineers, and to a bamboo bridge over the Tampasuk River, far beyond the imaginative and constructive powers of present day Dusuns, but of a type common enough in China, Tibet, and the Shan States. He also points out the significance of the name of the great Mount Kinabalu, which means "Chinese widow." Finally he finds confirmation of his argument in an allegorical legend of a *dragon* guarding a jewel on the top of Kinabalu and fleeing when the jewel was stolen, but leaving certain Chinese behind.

A. A.

SANTOS (Francisco O.). **Metabolism Experiments with Filipino Students in the United States.**—*Philippine Jl. Sci.* 1923. July. Vol. 23. No. 1. pp. 51–66. [19 refs.]

The purpose of these experiments was to ascertain whether it is possible for Filipinos who have resided one year or more in the United States and have become accustomed to American diet to remain in nitrogen equilibrium when receiving a Filipino diet of fish, rice, meat and vegetables. The subjects were four Government students taking post-graduate courses at Yale, the diet consisted of salmon, ham, lettuce, sweet potato and bananas, and the quantity was unrestricted. The result is shown in a series of tables. A positive nitrogen balance was obtained in all, and in no instance was the caloric intake less than 14 per cent. above the basal requirement. Analyses of the urine are given and compared with the figures of other observers.

There are reasons for thinking that the common Filipino diet is poor in salts. The bones of fish are usually eaten as well as the flesh, and pregnant or nursing women chew buyo, a thick paste of calcium hydroxide, spread on fresh betel leaves, and eat cigar or cigarette ash.

A. G. B.

COVELL (Gordon). **The Laevulose Tolerance Test for Hepatic Efficiency, and its Application in Certain Tropical Diseases.**—*London School of Tropical Medicine. Collected Papers: Clinical and Pathological.* 1923. Part 2. No. 12. 14 pp. With 12 charts. [4 refs.] Reprinted from *Guy's Hospital Reports.* 1923. July. pp. 354–367.

MACLEAN and DE WESSELOW (1921) pointed out that the only sugar in ordinary use the consumption of which did not produce a rise in the blood sugar concentration was laevulose. SPENCE and BRETT*, applying this test, concluded that in a subject with diminished liver efficiency a definite rise in the blood sugar followed the ingestion of laevulose, the height and length of the curve being a measure of the degree of the inefficiency. Details are given of the method of

* *Lancet*, 1921. Dec. 31. p. 1362.

estimation of the sugar done just before and one and two hours after the laevulose was taken. In 10 normal persons the rise in blood after cellose ingestion was very slight. Of 13 general medical cases, in 9 the rise was slight, and in 4 it was greater, especially so in the case of a negro suffering from severe arsenical neuritis. In 14 patients with evidence of hepatic disease, non-tropical, there was an abnormal rise in all cases but two.

To come to the tropical cases, six cases of sprue were tested ; three were normal, two showed slight liver inefficiency and one moderate liver inefficiency, but he had also a positive Wassermann. Of 15 cases of amoebiasis all but three showed more or less liver inefficiency, and in the stools of these histolytica cysts were not present. Most of the remainder had cysts, and in most instances the liver could be felt. In several instances the liver acted normally after treatment. The author concludes that the claims of MACLEAN, SPENCE and BRETT are corroborated, that the test forms a valuable indication of hepatic disease in cases where there is no clinical evidence of it, that in chronic sprue there is no considerable degree of liver inefficiency, that in amoebiasis the liver is affected in the great majority of cases, and that by repetition of the test the effect of treatment on the liver can be estimated.

A. G. B.

FOURNEAU (E.), NAVARRO-MARTIN (A.) & TRÉFOUEL (M. & Mme.) **Les dérivés de l'acide phénylarsinique (arsenic pentavalent) dans le traitement des trypanosomiases et des spirilloses expérimentales. Relation entre l'action thérapeutique des acides arsiniques aromatiques et leur constitution.**—*Ann. Inst. Pasteur.* 1923. June. Vol. 37. No. 6. pp. 551–617. [Numerous refs. in footnotes.]

This long paper is a sort of monograph on the aromatic arsenates—their preparation and their toxic and therapeutic action. It cannot be summarized to any advantage, and it must suffice to represent the authors' point of view and to state some of their larger generalizations.

The authors' proposition is that the series of aromatic arsenic acid compounds have been neglected in favour of the arsenious acid series, owing to the fact that the former (*e.g.*, atoxyl and its acid derivatives) have no trypanocidal action *in vitro* and cause nerve trouble (amaurosis in man), whereas the latter are effective even in extreme and harmless dilution. They insist (1) that action *in vivo* does not necessarily correspond with action *in vitro*, since certain preparations of the arsenic acid series are more effective *in vivo* than some of the arsenious acid series, and (2) that although many of the arsenic acid series cause nerve trouble some of their derivatives have no such effect ; and they further argue that since, for instance, the isomeres of 606 have not the spirochaeticidal value of 606 itself, it is quite rational to imagine that the properties of 606 may be due not exclusively to its arsenic function, but to the isomeric modification which has placed its nitrate function in the *meta* position relative to its arsenic function instead of in the *ortho* position.

The authors' preliminary line of argument is that all investigations on this subject are tainted because of the great difficulty of obtaining the various compounds in a state of purity. They illustrate this

argument (1) by the case of 606, different samples of which are known to vary in toxity from 0·08 to 0·20 gramme (per kilo weight of given animal) according to their manner of preparation ; and (2) by comparing the toxity of amino-oxyphenyl-arsenate of soda as determined by EHRLICH with that of the same salt prepared in a state of infinite purity and tested by themselves—in the former case, for a mouse of 20 grammes, it was about 0·025 gramme, in the latter case 0·035 gramme. They add the interesting observation with regard to oxyaminophenylarsenic acid, that a neutral solution made with the calculated quantity of carbonate of soda may be more toxic (in extreme cases one-third more) than the corresponding amount of the recrystallized soda salt.

The authors' researches, which have been conducted with products of standard purity prepared by themselves, have been concentrated particularly on the alterations in toxic and therapeutic effect brought about by the adjustment and re-adjustment of different functions substituted in the phenylarsenic molecule.

The following are some of the conclusions of greatest generality :—

The amine function when substituted in the *para* or *meta* positions has a positive disintoxicant power and slightly increases the parasiticidal effect of phenylarsenic acid ; the *ortho* position is always bad. A second amine function, alongside the amine function in the *para* position, transiently diminishes the toxic effect. A third amine function increases the toxic effect and lessens the therapeutic effect.

The phenolic function OH increases the parasiticidal action of phenylarsenic acid even more than the substitution of the amine function, but the position of OH does not seem to exercise the same importance, except that *ortho* alone is bad.

The product which (with small animals) gives the best results, "and consequently contains the best functions in the best possible positions," is 4 amino-2 oxyphenylarsenic acid (269).

The acetylation of the amine function of 189 and most of its isomeres has an unfavourable effect in the treatment of trypanosomiasis (except when the amine function is in the *para* position), but not in the treatment of spirillosis ; and stovarsol (acetylamino-oxyphenylarsenate, or 190) administered by the mouth not only cures but also forestalls syphilis.

A. A.

KNIPPING (H. W.). **Ueber die Ernährung des Tropenbewohners.** [The Alimentation of the Tropical Resident.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1923. Nov. Vol. 27. No. 11. pp. 404–413. With 1 fig. [4 refs.]

In the present article the author makes a further contribution to his study on nutrition in the tropics (see this *Bulletin*, Vol. 20, p. 922). Much that he lays before his colleagues in those parts is culled from other authorities and contains but little new to those accustomed to deal with diet. That the basal metabolism is somewhat lower for warm climates (the author states 10–15 per cent.) is not unexpected, and that what RUBNER calls the specific dynamic action of foods (specially noteworthy in protein metabolism) does not materially differ from the normal in the tropics is also what one would anticipate. Protein intake should not fall below a certain minimum, and that vegetable protein is not of the same

nutritive value as that of animal origin are physiological commonplaces, and that in hot climates the protein should not exceed the minimum is the advice derived from universal experience. The need for vitamins and for roughage in the shape of cellulose is not confined to the tropics; the same can be said for the unwisdom of a heavy midday meal and the advisability of dividing the intake into more equable portions throughout the day.

W. D. Halliburton.

Abbatucci. **Les stations hydro-minerales des colonies françaises.**—*Congrès de la Santé Publique et de la Prévoyance Sociale, Marseille, 11–17 Septembre* 1922. *Rapports.* pp. 249–262.

In giving a sketch of the mineral water stations of the French Colonies the author notes that the two chief possessions, Indo-China and French West Africa, are poorly served, the most important springs being found in the volcanic islands. Madagascar is especially favoured in its thermal springs at Antsirabe, at 1,500 metres altitude, the waters of which have been frequently studied. The climate is delightful. There is a doctor in residence and a hotel in course of construction. The mineral waters of Algeria come in also for mention.

A. G. B.

de Jong (D. A.). **Microörganismen en lage temperaturen.**—*Tijdschr. v. Vergelijkende Geneesk. enz.* Leiden. 1923. Sept. 26. Vol. 9. No. 3. pp. 214–218. [4 refs.] (English summary pp. 219–221.)

Some observations on the resistance of micro-organisms to low temperatures, made at Leiden in the course of experiments in conservation of meat and fish, are here recorded. Different species of dysentery bacilli were killed at —20° C., and this observation was confirmed. Enteric bacilli, *B. coli*, *B. faecalis alcaligenes*, and *B. lactis aerogenes* were not killed at —20° C. (ice-chest), or at —190° C. (liquid air), or at —253° C. (liquid hydrogen). *Trypanosoma lewisi* died after 80 minutes at —20° C. and after an hour at —30° C., and after 2 hours at —190° C. (liquid air). *T. evansi* became harmless after one day at —5° to —11° C.; after 90 minutes at —20° C.; and after 9 minutes at —191° C. (liquid air). *T. equiperdum* lost its virulence after 3¼ hours at —20° C. but remained alive after 21 days at —191° C. (liquid air); and *T. venezuelense* and *T. brucei* reacted in almost the same way as *T. equiperdum*.

A. A.

(i.) Fouché (F. P.); (ii.) Hollander (Bernard); (iii.) Sharp (N. A. Dyce); (iv.) Blair (M. Cameron); (v.) Walker (J. Bell); (vi.) Orenstein (A. J.). **Freedom of Negro Races from Cancer.** [Correspondence.]—*Brit. Med. Jl.* 1923. June 30 p. 1116; July 7, p. 46; July 14, p. 86; July 21, pp. 130–131; Aug. 11, p. 268; Aug. 25, p. 342.

i. During 6½ years in the Orange Free State among a population, mainly Basuto, of 14,000, the writer did not see in a native a single case of gastric or duodenal ulcer, colitis, appendicitis, or cancer, although these diseases were "frequently seen" in the white population. On the other hand, when sojourning in the Western Province of South Africa, he saw 2 cases of carcinoma of the breast in native women of

the local coloured race, a race that has lived under civilized conditions for the last 300 years. The writer thinks that these facts are worthy of serious consideration.

ii. Quotes the African explorer, STANLEY, and certain medical correspondents, as to freedom of natives in Africa from cancer, and the belief of some of the correspondents that this immunity is the result of vegetarian diet.

iii. States that even in coast towns of W. Africa, where natives have been in contact with Europeans for 400 years, cancer is extremely rare, and that in N. Nigeria only one case (mamma) has been recorded in recent years. States also that in the course of two years in Abyssinia he never heard of a case of cancer.

iv. States that in the course of 22 years' watch in Nigeria he has never seen a case of carcinoma or sarcoma, though carcinoma has occasionally been reported from coast towns and chiefly in natives who have been in touch with European customs. Points out, however, that hardly anything is known of the indigenous pathology of the unsophisticated interior country.

v. In 1904 saw a case of epithelioma of the penis in a Nyasaland negro—the first known in that region; the patient had come from a place where he "would come a good deal in contact" with European habits.

vi. In the course of a hundred consecutive autopsies of native African mine labourers (of whom the majority are between 25 and 40 years of age) the author has observed two cases of carcinoma, both being in men of the Shangaan race. In one case the pancreas and the glands of the neck, in the other case the liver, were the organs affected. Dr. PIRIE, of the South African Institute of Medical Research, also has published several cases of carcinoma in (? African) natives [see this *Bulletin*, Vol. 20, p. 213].

A. A.

PRENTICE (George). **Cancer among Negroes.** [Correspondence.]—*Brit. Med. Jl.* 1923. Dec. 15. p. 1181.

The author, who writes from Nyasaland, had accepted the belief that negro races are exempt from cancer until he encountered a negress with a tumour resembling an early scirrhus of the breast, which he did not see again until it had destroyed not only the breast but also the bony chest-wall beneath, and had laid bare the heart. Since that he has seen epithelioma of the face, destroying the eye and attacking the orbit; a malignant tumour that had split the face and displaced the eyes to a lateral position; fatal cancer of the ovary; malignant disease of the liver; and tumours of the testicle which, if not cancerous, were of nature unknown. He has not seen cancer of lip or mouth.

If there be any relative immunity to cancer, it cannot surely be attributed to abstinence from meat, for the negro will eat all the meat he can get, whether still warm prey or full of maggots, and he is only a vegetarian of necessity. The one circumstance ever present to the civilized man, but absent from the philosophy of the negro, is worry. The negro's grief is washed away in a flood of tears. If there be some negro immunity from malignant disease, may this be a factor?

The author muses over the immense field before the histo-pathologist in tropical Africa, where all the world is so busy looking for parasites in blood and stools.

A. A.

Adler (S.) & Cummings (E. H. Taylor). **Malignant Growths in Natives of Sierra Leone.**—*Ann. Trop. Med. & Parasit.* 1923. Dec. 21. Vol. 17. No. 4. pp. 535–537. [4 refs.]

It has often been stated, the authors write, that malignant growths are rare or absent in West Africans, and this has been attributed to non-adoption of European habits, but Europeanization, "whether or not it were conducive to the spread of malignant growths, would certainly be responsible for intelligent natives afflicted with them consulting medical officers. Thus civilisation may be wrongly blamed for the spread of the disease, when it is only responsible for its diagnosis."

The authors record eight cases in West African natives, five of which came under their observation between May and November, 1922. Six were in aborigines, two in "Creoles." The former were, melanotic sarcoma of the foot, epithelioma of the scrotum, meningo-sarcoma in the temporal region, primary and secondary carcinoma of liver and carcinoma of breast. The growths in "Creoles" were epithelioma of lip and primary carcinoma of liver. Diagnosis was in each instance the result of section of the tumour.

A. G. B.

Dekester (Maurice). **Le cancer au Maroc.**—*Bull. de l'Assoc. Française pour l'étude du Cancer.* 1923. Jan. Year 16. Vol. 12. No. 1. pp. 31–48. With 2 figs.

The author points out that in Morocco special measures are in force for combating venereal diseases, tuberculosis, malaria, typhus and plague, but not for combating cancer. He himself in five months at a hospital at Fez has seen 16 cases of malignant disease which he describes. All but one were epithelioma, in 9 cases of the skin, in 4 of skin and mucous junctions, and in 2 of glands. He has also seen 2 tumours of bone, 6 of the breast, and others of the pylorus and liver, and thinks that the view that cancer is rare in warm climates must be abandoned.

A. G. B.

Neve (Ernest F.). **Kangri-Burn Cancer.**—*Brit. Med. Jl.* 1923. Dec. 29. pp. 1255–1256.

Since the year 1881 there have been 2,491 operations for epithelioma in the Kashmir Mission Hospital, and of these 2,000, or 84 per cent., were for *kangri* cancer. The *kangri* is described as an earthenware bowl 5 or 6 inches in diameter, surrounded by basket work and surmounted by a wicker handle. It is heated by means of wood charcoal and is worn against the skin under a single loose garment. The growths are commonly found on the inner sides of the thighs and the anterior surface of the abdomen, above or below the umbilicus. It is commoner in men than women, and the average age of onset is 55. Apart from the *kangri*, small pigmented patches or papules may be found all over the body of many elderly Kashmiris. The constant application of heat leads to every degree of chronic dermatitis, from mere redness to thickened patches, warty projections, or horny outgrowths from the surface. Scars are frequent. The cancer is met with in three forms—a circular or oval ulcer about 1½ inches in diameter, with deep crater-like centre and raised edges, the commonest form;

a cauliflower excrescence; an excavation with little evidence of over-growth, generally in the aged. These cancers are always very foul. The average duration of life is 15 months. The glands are infected in 50 per cent. of the cases; in operating they should be dealt with first. Twenty per cent. recur.

A. G. B.

i. Spittel (R. L.); ii. Davidson (James); iii. Turner (Percy E.). **Betel Chewing and Cancer.** [Correspondence.]—*Brit. Med. Jl.* 1923. Oct. 6, p. 632; Oct. 20, pp. 733–734; p. 734.

iv. ——. **Betel Chewing and Cancer.**—*Ibid.* 1924. Jan. 26. p. 158. With 1 fig.

i. A writer on the causes of cancer having expressed a doubt whether cancer in betel chewers is the result of irritation, Dr. Spittel gives his Colombo experience. He finds that cancer of the cheek is among the commonest malignant growths in Ceylon, and as frequent in women as in men. He has no doubt that the condition is due to irritation, and thinks that it is the lime which is the irritant. The disease begins as a leucoplakia or roughening of the part of the buccal mucous membrane that lies in contact with the molars and premolars, themselves coated with deposits of tartar and lime, providing a sand-papery surface. Carcinoma of the penis is also surprisingly frequent and is attributed to congenital phimosis and the irritation of caked smegma.

ii. The writer cites published statistics of the frequency of buccal cancer from Neyoor Hospital in Travancore. Of 1,700 cases of cancer collected by Bentall buccal cancer formed no less than 70·6 per cent. The writer has records of 222 cases of buccal cancer from the same hospital, operated on in seven years, and gives some details of the preparation of the quid. Among the Brahmin community, who chew freely, few cases of buccal cancer are seen.

iii. Dr. Turner gives his experience of South India. At Nagercoil, at the tip of the peninsula, he has sometimes operated on three and four cases of buccal cancer in a week. He agrees with Spittel as to the early stage and course and gives details as to the involvement of glands, but differs from Davidson in that cases are "quite common" among the Brahmins. In the minority of persons who do not chew buccal cancer was not seen.

iv. Spittel writes that buccal cancer in Ceylon is met with most frequently between the ages of 35 and 50, but is not rare between 25 and 30 and especially in Tamil women. Tamils take to betel chewing earlier and with more inveteracy than do Sinhalese. The Registrar-General's figures for Ceylon in 1921, though "obviously incorrect," give buccal cancer 163, cancer of the digestive system 137, uterus 20, breast 13, other organs 97. The latent period may be short or very long. Buccal cancer is very fatal and after removal invariably recurs. The ingredients of the "chew" seem not to differ from the Siamese.

Dr. A. Leitch reports on a specimen of buccal cancer received from Dr. Spittel.

[On this subject Ellis should be consulted, this *Bulletin*, Vol. 20, p. 56.]

A. G. B.

RABELLO (Eduardo). **Sur la prophylaxie du Cancer au Brésil.**— *Bull. de l'Assoc. Française pour l'étude du Cancer.* 1923. June. Year 16. Vol. 12. No. 6. pp. 463–466.

Cancer, though not one of the grave sanitary problems of Brazil, is on the increase, especially in the temperate parts of the country, but it is here that the foreign element is densest. The Federal Government has created a bureau for its control of which the writer is Director. There are at present three institutes where the disease is studied and treated, at Rio de Janeiro, at Sao Paulo, and in the State of Minas Geraes. [See DA COSTA, above, p. 309.] A new Institute, for which a generous donor has given 5,000,000 francs, is to be erected at Rio and named after Oswaldo CRUZ, the great Brazilian hygienist.

A. G. B.

WOODCOCK (H. M.). **A Modification of Dr. Charles Creighton's View of Malignant Growths.**— *Jl. Roy. Army Med. Corps.* 1923. Oct. Vol. 41. No. 4. pp. 241–268. With 16 figs. [14 refs.]

The author's speculations on "haematophagy" as a complete and natural process, and also as an imperfect and pathological process, have been noticed in this *Bulletin* (Vol. 19, p. 620, and Vol. 20, pp. 676 and 677), and are now embodied in a theory of malignant growths, of which we here can give but the outline.

The author reminds us (1) That the tissue-cell, howsoever subordinated and specialized, retains its individuality and its primordial capability—latent, or fully potent—of ingesting and digesting solids,—a valuable reminder. (2) That many tissue-cells do ingest and digest solids, particularly red blood corpuscles, this physiological haematophagy—which he now distinguishes as "haemetaboly"—being exemplified in the phagocytosis of red blood corpuscles by macrophages, in the destruction of red blood corpuscles by certain liver cells, in the manufacture of colloid matter by the thyroid gland (extracellular), in the formation of pigment by epithelial cells, and in the proliferation of the epithelium of the mammary gland in the early stages of pregnancy. This form of haematophagy is a normal process,—the specialized tissue-cell ingests and assimilates its quantum of blood corpuscles not for itself alone, but for the good of the organism as an inclusive whole.

But, in circumstances as inscrutable as the origin of life itself, a tissue-cell may become insubordinate and [like the seditionist who understands no difference between the unlicensed rights of the jungle and the limited rights of the civilized man] may seize all it can get, for its own use, without any concern for its incorporate obligations. Such a cell is the cancer cell—a disordered tissue-cell that feeds on blood corpuscles, having "become able to produce of itself an all-powerful digestive enzyme independently of outside influence or control; and this inherent capacity is transmitted to its descendants in cell division." Unless, of course, as in the case of a true endothelioma, it is, as CREIGHTON taught, a cell of the vascular tissue.

What starts the cell on its malignant chaotic course is a mystery, which, however, seems for its manifestation to depend upon iron. Growth and multiplication cannot occur without chromatin, and chromatin depends on iron. If a cell ingests iron (haemoglobin or chromatin) then in the absence of control, proliferation may be expected as the final result.

A. A.

Baujean (R.). **Alastrim et Variole.**—*Bull. Soc. Path. Exot.* 1923. Nov. 14. Vol. 16. No. 9. pp. 676–692. With 2 plates & 4 charts. [10 refs.]

An account is given of an epidemic of alastrim in Martinique in its clinical, microscopical and experimental, and immunological aspects. It is noted that the vesicles remained rounded instead of becoming flat and were never umbilicated either in this or in the pustule stage. If there were depressed scars, and this was unusual, they were not permanent. Like other observers, he remarked the satisfactory general state of the patients, even when they were covered with pustules, but there were exceptions. In several thousands of patients the mortality did not exceed 1·5 per cent.; however, a few vigorous subjects succumbed.

Inoculations of the vesico-pustule contents made into calf, monkey, rabbit, and guineapig, whether by pricks or scarification, gave no positive result, beyond a transitory reaction in a spider monkey [*cf.* MacCullum and Moody, this *Bulletin*, Vol. 19, p. 438, but Leake and Force seem to have been more successful, *l.c.* Vol. 18, p. 293]. Of rabbits inoculated on the shaven skin but presenting no alastrim eruption which were afterwards vaccinated some were refractory, others "had a vaccinal eruption" [*cf.* Leake and Force, *loc. cit.*]. He failed to immunize four rabbits against vaccinia by inoculation with the serum of convalescents. If 40 per cent. may be regarded as normal for all varieties of mononuclears there was some degree of mononucleosis; this is regarded as a character of variola. Paul's reaction was tested with the vesico-pustules, at various stages, of 15 patients, always with a negative result.

It was shown that alastrim and vaccinia confer immunity on one another. 72 patients unvaccinated, or not for many years, were vaccinated in the course or at the close of an attack; in four there was a slight take and in 68 no result at all. The other way there was plenty of evidence. All or almost all the alastrim patients had never been vaccinated, or not revaccinated with success. When some members of a family had been vaccinated and others not, alastrim respected those but attacked these. In a ward of the civil hospital where a case occurred, the other patients, about 30, were vaccinated, but one was overlooked. This patient alone contracted alastrim. No cases occurred among the personnel in the hospital, or the Institute of Hygiene, or in the schools (4,000 children), all protected by recent vaccination.

It is incontestable, the author writes, that vaccination has protected against alastrim and has been the best means of prophylaxis. This is, he thinks, a very strong presumption in favour of the identity of alastrim and smallpox, but irrefragable proof is still wanting.

A. G. B.

i. Hill (H. W.). **Report on an Outbreak of Alastrim in Antigua, B.W.I.**—*Canadian Med. Assoc. Jl.* 1924. Jan. Vol. 14. No. 1. pp. 44–45.

ii. Branch (E. Wm. R.) & McDonald (W. M.). **Report of an Outbreak of Alastrim in Antigua.**—*Ibid.* p. 45.

i. "Clinically, alastrim, amaas, Kaffirpox, Cuban itch, Sanaga pox, glass pox, milk pox, and mild smallpox are indistinguishable; they are all

prevented by vaccination, and hence (since vaccinia is smallpox, modified by the cow) show the essential biological as well as practical test for etiological identity with smallpox." . . . . . "Every item of proof so far accumulated indicates that the 'alastrim' of the tropics is merely the mild smallpox of the temperate zone under another name; a name it would be well to abandon, lest the mere existence of a separate name foster a mistaken belief in a separate etiological entity to correspond with it."

ii. Alastrim was first found in Antigua on January 22nd, 1923. Infection was traced to the wife of a police constable who had come from Dominica on December 2nd with a certificate of successful vaccination, though no marks of recent vaccination were seen. In two instances, out of some 30, the incubation period was 17 days, so that the authors would have the period of quarantine or surveillance extended from 14 to 21 days. Stringent measures were taken, including revaccination, and clean bills of health were issued on April 6th.

A. G. B.

Scott (Joseph M.) & Simon (Charles E.). **The Diagnosis of Smallpox by the Paul Method.**—*Amer. Jl. Hyg.* Baltimore. 1923. July. Vol. 3. No. 4. pp. 401–415. With 2 plates. [17 refs.]

The Paul method of diagnosis of smallpox, an account of which was given in this *Bulletin*, Vol. 19, p. 440, is here described and discussed in all essential detail, with excellent figures (reproduced). Briefly, it consists in inoculation of the rabbit's cornea with variolous material, the sacrifice of the animal after 48 hours, and the examination of its cornea in sublimate alcohol with the naked eye and in sections passing through the lesions.

The authors conclude that when controlled by histological examination the reaction constitutes a most valuable method for the diagnosis of smallpox, that in many cases the macroscopic picture of the cornea in the sublimate bath is sufficient for diagnosis, that a negative result will in most cases exclude smallpox, that pyogenic infection of the skin may produce a picture which macroscopically could be mistaken for positive, but that the histological appearances will correct this impression, that in varicella negative results are so constant that a doubtful reaction should arouse suspicion and lead to re-examination of the patient.

Paul's method, we learn, is now used as a matter of routine in various public health laboratories both in Germany and Austria.

For the technique, the paper or at least the extracts already made (*loc. cit.*) must be consulted.

The appearance of variola-infected and non-infected cornea after treatment with sublimate alcohol is thus described:—

"When the normal control eye is placed in the sublimate bath, it will be noted that the cornea becomes evenly opaque, with the exception of faint lines which occasionally are visible and represent the scratches, made during scarification. Occasionally, though exceptionally, the background assumes a mottled appearance at first, but this gradually changes to a uniform opacity (fig. 1).

"*A variola-infected cornea* presents an entirely different appearance. The general background has also become milky white, but here and there within the scarified area *intensely white and opaque* little elevations make their appearance, some of which, already at this time, present a distinctly visible, dark little crater, in the centre of the elevation. This picture is

pathognomonic of a variola infection. It is never seen after inoculation of varicellar material and is very different from the picture presented by a purulent process (figs. 2, 3 and 4).

"The number of little elevations is variable. Sometimes one sees only three or four, while at other times two dozen or more may be discernible. Usually they are discrete and then circular in outline, with very clear cut margins. At other times they show a tendency to become confluent. Diffuse changes, however, do not belong to the variola picture."

Sections should be examined as a matter of routine unless the observer has already gained much experience. They show that the hummocks are the result of an increase in the size of the epithelial cells due to the imbibition of fluid, and that the crater-like changes are the result of desquamation (figs. 5 and 6).

FIG. 1.—Appearance of a normal eye in the sublimate bath, forty-eight hours following scarification. The same picture will be obtained in the case of an eye that has been inoculated with the contents of varicellar vesicles (magnification of about five diameters).

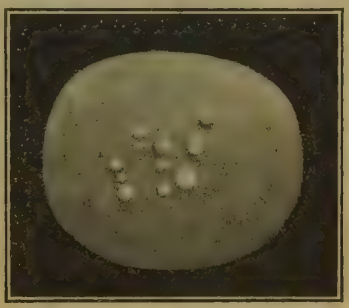


FIG. 2.—Appearance of a variolated eye in the sublimate bath, forty-eight hours after inoculation. Note the little hummocks, some of them showing beginning crater formation (same magnification).

FIG. 3.—Appearance of an eye in the sublimate bath, forty-eight hours after inoculation with a mixture of variolar material and a pure culture of Streptococcus erysipelatosus; a few isolated hummocks can be detected in the diffusely opaque degenerated zone (same magnification).

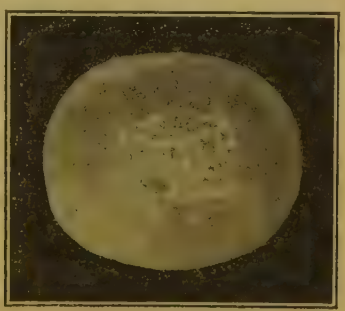


FIG. 4.—Appearance of an eye in the sublimate bath, forty-eight hours following inoculation with a pure culture of Streptococcus erysipelatosus; note the absence of individual hummocks and the diffuse character of the destructive lesions (same magnification).

FIG. 5.—Section showing a typical epithelial hummock under the low power. (Objective 16 mm., ocular 10.)

FIG. 6.—Section through an epithelial hummock with beginning crater formation; note the irregular position of the epithelial cells and the presence of Guarnieri bodies in many of them. (Objective 4 mm., ocular 10.)

[Figs. 1 to 6 are reproduced from the *American Journal of Hygiene*.]

The method was tested on 104 rabbits' eyes, of which 36 were normal controls: 14 were inoculated with cowpox vaccine, 18 with the contents of smallpox pustules and vesicles, and 8 with the contents of varicella vesicles; and various forms of herpes, pemphigus, dermatitis herpetiformis, ringworm, cultures of pyogenic organisms, nasopharyngeal swabbings, were similarly tested. As is shown in a table, the variola (4th–8th day) and vaccinia cases were all positive, varicella and the rest all negative. It is well to dilute vaccine virus (1 : 1,000), if of recent date.

A. G. B.

HOFFMANN (W. H.). **Blood Studies in Smallpox, with Special Reference to Alastrim.**—*Jl. Trop. Med. & Hyg.* 1923. June 15. Vol. 26. No. 12. pp. 217–219.

The author has studied for three years in Cuba an epidemic of mild smallpox. All the cases were isolated for 40 days, during which he made about 300 blood observations. His results were as follows:—

"(1) The blood in smallpox shows very marked changes in total number and in relative distribution of white cells—namely, very high leucocytosis

beginning from the fourth day, unusually high eosinophilia, very marked relative lymphocytosis, presence of myelocytes, initially high Arneth index.

" (2) Only in chicken-pox a similar differential count is observed ; but the differential diagnosis in this case is very easy because of the absence of leucocytosis in chicken-pox.

" (3) The changes are still very marked at the end of the sixth week, and probably longer ; this makes possible a retrospective diagnosis even after clinical recovery."

There is a leucopenia for the first three days, during the prodromal symptoms, but on the fourth day the number of leucocytes rises rapidly, with averages of 17,000 from the ninth to the fourteenth day. The count remains high during the third week and has not returned to normal at the end of the sixth week. The percentage of polymorphs remains below the normal. The increase of eosinophiles is one of the characteristic symptoms : 3–10 in the first three weeks, it increases from the eighteenth day to 15–20 per cent., and this high percentage is often still present at the end of the sixth week. The author thinks that the eosinophiles are of great importance for the curative processes and for the development of immunity. The lymphocytes are above the normal after the first week. The large mononuclears are increased to 4–8 per cent. Myelocytes " are scarcely ever missed " in smallpox ; they form 1–3 per cent. or more. The Arneth index is up to 90 in the first week, and later approaches the normal.

The author writes that these blood tests " cannot be recommended enough for clinical purposes of diagnosis in infectious diseases." The total number of leucocytes and of eight varieties and the Arneth index are tabulated for each of the 40 days. He suggests that studies of this kind may throw light on the " alastrim question."

A. G. B.

HOFFMANN (W. H.). **Diagnostico diferencial de la viruela y la varicela por la sangre.** [Blood Examination in the Differentiation of Variola from Varicella.]—*San. y Benefic. Bol. Ofic.* 1922. Sept.-Dec. Vol. 27. Nos. 9, 10, 11 & 12. pp. 465–479. With 8 charts.

——— **Comparative Blood Studies in Smallpox and Chickenpox.**—*New York Med. Jl. & Med. Rec.* 1923. Nov. 21. Vol. 118. No. 10. (Whole No. 2269.) pp. 616–618. With 5 text figs. [1 ref.]

Of late years smallpox appears as a comparatively mild disease, but a mild case may give rise to severer forms. Professor Hoffmann (Havana) has made blood examinations at all stages of smallpox and of chickenpox with a view to finding a method of differentiating them. Sixty variola patients were under observation for 40 days and 40 varicella patients for 20 days. The following table has been compiled from the statements diffused through the text to show the differences between the findings in the two conditions. It will be seen that the high leucocyte total is not due to the pustulation and relative increase of polymorphonuclears, which remain below the normal throughout.

Leucocyte counts in Variola and Varicella.

	Period of Disease.	*Variola.*	*Varicella.*
Total Leucocytes per cmm.	Third to sixth day ..	4,000—6,000	3,000—7,000
	Seventh to ninth day ..	17,000	10,000—12,000
	Tenth to fourteenth day	17,000—30,000	Falling to normal
	Twenty-first day ..	12,000—24,000	or even lower to
	Twenty-second to fortieth day	Gradual return to between 9,000 and 12,000.	4,000
Polymorphonuclears.	First to sixth day ..	20—30%	15—30%
	Fourteenth to twenty-first	45%	30—45%
	Twenty-second to forty-second	30—40%	..
	Arneth Index	90	..
Eosinophiles.	First to twenty-first day	3—10%	Normal first week,
	Third to sixth week ..	15—20 (perhaps 30)%	4—10% second and third weeks.
Lymphocytes.	First week	45%	75%
	Third week	65%	Third to sixth
	Fourth to sixth week ..	40—50%	weeks average 30—50%

H. Harold Scott.

CUNNINGHAM (J.) & CRUICKSHANK (J. A.). **A Note on the Effect of Intravenous Injections of Antimony Tartrate upon the Development of Vaccinia Virus.**—*Indian Med. Gaz.* 1923. Sept. Vol. 58. No. 9. pp. 427–428.

SAMI SABONGY Bey, having in BYAM & ARCHIBALD'S "Practice of Medicine in the Tropics" recorded the results of treatment of non-haemorrhagic smallpox by intravenous injections of antimony tartrate as "promising," the authors tested its effect on the development of vaccinia in the calf. Five calves and five controls were thus treated under experimental conditions, with the result that the development of vaccinia was unaffected. "It is therefore more than likely that it [potassium antimony tartrate] has little or no effect upon the development of the virus of variola in the human subject."

A. G. B.

REID (G. Archdall). **Small-Pox, the Vaccination Propaganda, and Malaria.** [Correspondence.]—*Brit. Med. Jl.* 1923. Aug. 11. p. 261.

In 1921 Sir Archdall Reid recommended the administration of a powder containing aspirin gr. x, pulv. ipecac. co. gr. v, and phenacetin gr. v in acute toxaemia. He believes that the toxins of disease are largely eliminated in the sweat, that the toxins paralyse the sweat centre and so prevent their own elimination and that the medicine deparalyses it; he finds that the beneficial effect is usually accompanied by sweating. He here writes that the treatment aborts vaccinia; he believes that it would abort or at least mitigate the severity of smallpox; and he suggests its trial at the earliest hint of the hot stage in malaria. He thinks that it would end that stage quickly and leave the merozoites en route to invade fresh corpuscles defenceless. Quinine would be employed at the same time.

A. G. B.

REMLINGER (P.). **L'éléphantiasis au Maroc.**—*Bull. Soc. Path. Exot.* 1923. June 13. Vol. 16. No. 6. pp. 422–425. [2 refs.]

The fairly frequent occurrence of elephantiasis in Morocco, over which country it is generally spread, is contrasted with its rarity in Algeria and Tunis. Its incidence is almost equal in Mussulmans and Jews; it begins as a rule between ages 20 and 30, is more frequent in men than women, and attacks almost exclusively the scrotum and lower limbs, in which in a third of the cases it is double. Clinically it corresponds to the description in the text-books. The glands of the hypertrophied area are nearly always free. The leucocyte formula is near the normal and there is never eosinophilia. Search for microfilariae by night and by day has never had success. A diplococcus or tetracoccus can be grown from the serum which exudes when the skin is pricked, but as the author can grow it from the skin of healthy subjects he thinks little of it. It stains by Gram and is probably a staphylococcus. A streptococcus may be causative, but often cannot be demonstrated. It is doubtful whether the disease is inoculated through the skin, for it is equally common in town and country, in the barefooted and in shoe wearers. Itch is frequent in Morocco, but seems never to be the precursor of elephantiasis. In fact the etiology is a mystery. The affected parts may reach a great size, but the prognosis is good. Some cases have been followed for 12 years. Sometimes there is improvement—spontaneous and not due to treatment. The only patient who consented to operation, a scrotal case, succumbed to septicaemia in a week. This was a streptococcus case.

A. G. B.

DEKESTER & MARTIN (J. M.). **L'éléphantiasis dans la région de Fez (Maroc).**—*Bull. Soc. Path. Exot.* 1923. July 11. Vol. 16. No. 7. pp. 494–496.

Five cases of elephantiasis, four males and one female, have been met with at the hospital at Fez during the years 1920-23. None of the patients had ever been away from Morocco. No filarial embryos were found in any although repeated examinations were carried out, nor have the authors ever seen a case of filariasis among Moroccans (but the disease exists at Fez among immigrant Senegalese). They are of opinion that all five cases were of microbial origin with secondary chronic inflammation rather than filarial.

H. Harold Scott.

WALLER (H. W. L.). **The Operation for Elephantiasis Scroti.**—*Lancet.* 1923. Nov. 24. pp. 1132–1133.

The author describes an operation which he has practised in Zanzibar with successful results for the last six years. His procedure is said to be a modification and simplification of a method introduced in America by FAUNTLEROY. With the patient in the lithotomy position, a simple double-bar screw clamp, which can be tightened or loosened at will, is applied to the neck of the tumour as close to the trunk as possible. A horse-shoe shaped incision is then made in the upper and anterior part of the tumour, the vertical limbs of this incision starting two inches to right and to left of the middle line just below

the clamp, curving to meet each other immediately below the preputial orifice, and inclosing a flap 4 to 4½ inches wide. The remainder of the tumour is encircled by an incision which extends at right angles from the centre of one vertical limb of the horse-shoe to the other round the posterior aspect of the scrotum. The horse-shoe flap, with its contained penis, is then raised, and a small segment of its lower margin sacrificed by dividing the preputial tissues transversely about one inch distal to the glans penis. The inner lining of the prepuce is preserved, and the flap having been freed from elephantoid tissue is wrapped with the penis in gauze and thrown back on to the abdomen. Testes and cords are then sought for, dissected out, protected with gauze and temporarily disposed of in the same way. If hydroceles are present, and such is nearly always the case, the tunicae are either excised or everted. The large mass of the tumour is now removed, the clamp loosened and complete haemostasis secured. From the skin which has been left behind and subsequently freed "as far as possible" from diseased tissue, the clamp having been withdrawn, a pocket of sufficient size to hold the testes and cords is fashioned and sutured. The penis is enveloped in the horse-shoe flap, which is stitched below along the line of the absent raphe and joined anteriorly to the cut edge of the prepuce.

The author notes that recovery is rapid even in the absence of complete asepsis, that potency is as a rule regained, and that the mortality is nil.

[Most surgeons with experience of elephantiasis of the scrotum appear to devise methods of operation either wholly or in part their own. The procedure described doubtless answers well in cases where there is a sufficiency of healthy skin for covering purposes.]

J. J. Pratt.

Dinguizli. **La pratique de l'obstétrique chez les populations indigènes de Tunisie.**—*Bull. Acad. Méd.* Paris. 1923. July 31. Year 87. 3rd Ser. Vol. 90. No. 31. pp. 120–122.

Hoffmann (W. H.). **Linfogranulomatosis Venerea.**—*San. y Benefic. Bol. Ofic.* 1922. July-Aug. Vol. 27. Nos. 7 & 8. pp. 387–390. [See this *Bulletin*, 1923, Vol. 20, p. 666.]

Hunt (D.). **Samoan Medicines and Practices.**—*U.S. Nav. Med. Bull.* 1923. Aug. Vol. 19. No. 2. pp. 145–152. With 2 figs.

Mukherjee (Phani Bhusan). **Intravenous Iodine in the Treatment of Septic Wounds.**—*Indian Med. Gaz.* 1923. Nov. Vol. 58. No. 11. pp. 537–538.

Ricou (M.). **Extraction par simple expression d'un gros calcul salivaire de la glande sublinguale.**—*Bull. Soc. Path. Exot.* 1923. Oct. 10. Vol. 16. No. 8. p. 601.